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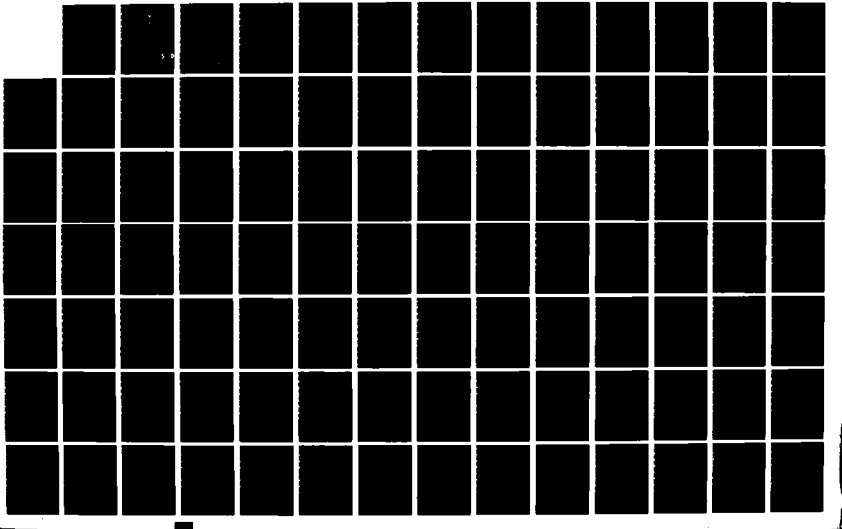

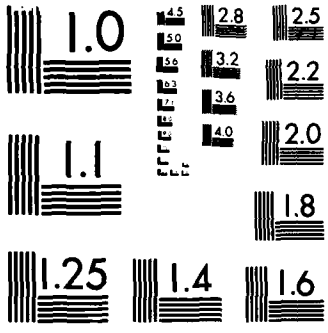

INSTRUCTIONAL SYSTEM DEVELOPMENT AT OPERATIONAL MISSILE UNITS

THESIS

Guy J. Fritchman
Captain, USAF

AFIT/GLM/LSM/85S-24

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY
AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

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THESIS

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Guy J. Fritchman, B.A.
Captain, USAF

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Captain Guy J. Fritchman

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List of Acronyms

AFB	Air Force Base
AFM	Air Force Manual
AFP	Air Force Pamphlet
AFR	Air Force Regulation
ATC	Air Training Command
CCTS	Combat Crew Training Squadron
CPOs	Comprehensive Performance Objectives
CRI	Criterion Referenced Instruction
DOTI	Directorate of Training - Instruction Branch
DOV	Standardization/Evaluation Division
DO22T	Emergency War Order (EWO) Training Branch
DO9	Codes Training Division
EWO	Emergency War Order
HQ	Headquarters
IG	Inspector General
ISMD	Instructional Systems Management Division
ISD	Instructional System Development
JPR	Job Performance Requirements
LCC	Launch Control Center
MCCMs	Missile Combat Crew Members
MPT	Missile Procedures Trainer
SAC	Strategic Air Command
SACR	Strategic Air Command Regulation
SIOP	Single Integrated Operational Plan
SMES	Strategic Missile Evaluation Squadron
SMW	Strategic Missile Wing

Abstract

This thesis describes the Instructional System Development (ISD) process as it relates to missile combat crew member (MCCM) training at the Strategic Air Command units. Written due to the lack of ISD literature applicable to operational units, it is intended to serve as a practical guide for instructors and staff members at the missile unit, enabling them to understand, apply, and control ISD in the development of MCCM job training with greater confidence and efficiency. Its description is based upon careful synthesis of related literature, telephone interviews, and a comprehensive survey of missile unit instructor cadre.

Specific focus within the thesis is on the ISD models applied at the missile unit, and the problems/benefits of applying ISD to MCCM job training. Research findings indicate that missile unit instructors modify the specific procedures recommended by two ISD models: the Five-Step Model and the Criterion Referenced Instruction Model. The problems/benefits of applying ISD at the missile unit are found to be similar to those at Air Training Command units. Overall indications are that missile unit instructors regard ISD models as useful tools for developing and conducting MCCM job training.

INSTRUCTIONAL SYSTEM DEVELOPMENT AT OPERATIONAL MISSILE UNITS

I. Introduction

General Focus

Instructional System Development (ISD) is a "systematic approach to training" (12:10). It is often applied when developing, conducting, or evaluating occupational training programs. Numerous ISD models exist: the Interservice Procedures for Instructional System Development, the Four Factor Approach to Job Analysis, the Five-Step Model, and the Criterion Referenced Instruction Model are four examples of such models. The models differ in specific procedural recommendations, but have similar characteristics. Each model is characterized by its "deliberate and orderly, but flexible" nature, and its focus on student needs (7:A1-3).

Developers and conductors of training programs (referred to as instructors) proceed in a "deliberate and orderly" fashion when using ISD models. Most models prescribe the ISD process in terms of a sequence of well-defined steps. Using the steps prescribed by an ISD model, instructors systematically "identify the critical job task that must be learned, the place where the task can best be learned (in the school, in the unit, or on the job), and the method of instruction" (20:2).

The steps prescribed by each ISD model, however, are intended as "tools" or guidelines, not as "restrictions" (21:2). ISD models identify a constant interaction between the environment and the development of a training program, and between the steps of the ISD process itself. This interaction necessitates occasional modification of specific ISD steps by the instructor. Furthermore, ISD models encourage instructors to obtain and adopt feedback throughout the process of developing and conducting training programs. Such flexibility allows the instructor to respond to the environment, the internal constraints of the specific training program, and to the needs of the students.

ISD, in fact, is centered on the needs of the student. Students are generally trained for a particular purpose. Depending on the purpose, certain outcomes are required of students in training programs; they must attain specific knowledge, be able to perform specific tasks, or demonstrate specific skills. ISD models thus demand that instructors identify these required behaviors (19:199), then promote active student involvement in developing and accomplishing the behaviors. Keys to active student involvement include the following: allowing individual students to progress at their own pace; providing ample opportunity for students to practice the necessary behaviors; and ensuring that students demonstrate accomplishment of the behaviors under the exact conditions and

standards required to perform adequately outside of the training environment. By promoting active student involvement, ISD fulfills the most direct need of students - assuring that graduates can perform the behaviors which are required in the real world.

The above characteristics of ISD are apparently appealing to the military services. For example, Air Force Regulation (AFR) 50-8, Policy and Guidance for Instructional System Development, directs that the ISD process be used for the development and operation of all its training programs (2:1). The other military services have likewise developed policy requiring the application of ISD.

Problem Definition

Numerous sources of literature have been written describing practical applications of the ISD process as related to military training programs. Most of these sources, however, portray its application at units where the primary mission is training. Fewer sources describe the practical relationship of ISD to operational units, where training is a secondary mission. Operational units thus rely solely on theoretical or general information about ISD from sources such as Air Force Manual (AFM) 50-2, Instructional System Development, and Air Force Pamphlet (AFP) 50-58, Handbook for Designers of Instructional Systems.

This lack of practical literature for operational units is an unfortunate circumstance for instructors at such units. Relegation of training to a secondary mission at operational units means that fewer resources can be devoted to training programs than at training units. With fewer resources to devote, instructors at operational units could benefit from more practical literature describing ISD for their particular situation. Such literature could ultimately improve the effectiveness of ISD and the training programs at operational units. This research project will therefore examine and describe the ISD process as it is related to one type of operational unit.

Specific Focus

Goal. This research seeks to develop a detailed description of ISD as it relates to developing and conducting job training for missile combat crew members (MCCMs) at operational Strategic Air Command (SAC) missile units. Such a description could serve as a practical tool for instructors and missile staff members, enabling them to understand, apply, and control ISD in the development of job training with greater confidence and efficiency.

Job Training Defined. For the purpose of this research report, job training is the process by which MCCMs develop and maintain the knowledge, skills, attitudes, or behaviors required to achieve the mission of the Single

Integrated Operational Plan (SIOP), which is to maintain nuclear equipped missiles on constant alert in preparation to launch upon Presidential orders. Three broad categories of job training are examined in this research project: weapon system training, Emergency War Order (EWO) training, and codes training. Through weapon system training, MCCMs develop and maintain their skills in operating the Minuteman or Titan weapon systems. Such training enables MCCMs to correctly operate equipment, perform launch procedures, respond to hazards, and understand nuclear surety. EWO training provides MCCMs with knowledge of the SIOP, and enables them to identify and respond to valid orders which execute their sorties. Codes training enables MCCMs to operate the specialized launch control system at Minuteman units. Each of these are further categorized into more specific types of training, including: recurring, Missiles Procedures Trainer (MPT), supplemental, remedial, unit orientation or upgrade, and transition training. Discussion of each specific type will be done in Chapter II.

Research Questions. Two questions foster research in pursuit of a description of ISD as it relates to MCCM job training:

1. Is any particular ISD model, combination of models, or component parts used at the missile unit?
2. What are the perceived problems/benefits of using ISD to develop and conduct job training?

Though these specific questions do not foster a means for investigating every conceivable circumstance, obtaining answers to them will provide sufficient information to analyze ISD as it relates to developing and conducting job training for MCCMs at operational SAC missile units.

II. Background

Overview

This chapter summarizes the available sources of information on ISD as they relate to job training for MCCMs at operational SAC missile units. It begins with a brief identification of the types of sources used as background information in this research. A large portion of the chapter is then devoted to describing two ISD models accepted within SAC. Next, the historical basis of ISD acceptance at SAC missile units is discussed. Following this discussion, missile unit training personnel, programs, and environments are identified. A summary of thoughts on the usefulness of ISD is also presented, prior to the conclusion of this chapter.

Sources of Background Information

A variety of sources have yielded useful background material. General descriptions of ISD models have been obtained from books, AFMs, and courses. Telephone interviews with ISD experts in the missile career field have been used to obtain historical information. Information regarding the specific personnel and programs involved in the missile unit training process has been extracted from SAC regulations. Research

studies concerning military applications of ISD were also useful sources of background material throughout this chapter.

Perhaps the most valuable source of information, however, has been this author's personal experience in applying ISD at the missile unit. This author, a former instructor and staff member at the 381st Strategic Missile Wing (SMW), McConnell Air Force Base (AFB), Kansas, has six years of experience in developing, conducting, and supervising job training. This experience includes time both as a weapon system and EWO instructor, and as a Wing Instructional System Manager, responsible for the overall supervision and coordination of ISD as it relates to job training at the unit. To supplement this experience, the author has received ISD-related training including the "Development and Management of Instructional Systems" course at Sheppard AFB, Texas, and the "Criterion Referenced Instruction Training" course at Vandenberg AFB, California.

ISD-Related Methodologies

ISD Models. Two ISD models are accepted by SAC missile units. One model is the USAF Five-Step Model, as prescribed by AFR 50-8, Policy & Guidance for Instructional Systems Development; AFM 50-2, Instructional System Development; and AFP 50-58, Handbook for Designers of Instructional Systems. The second model is the Criterion Referenced Instruction (CRI) Model, by Dr. Robert F. Mager. Each of these models require examination.

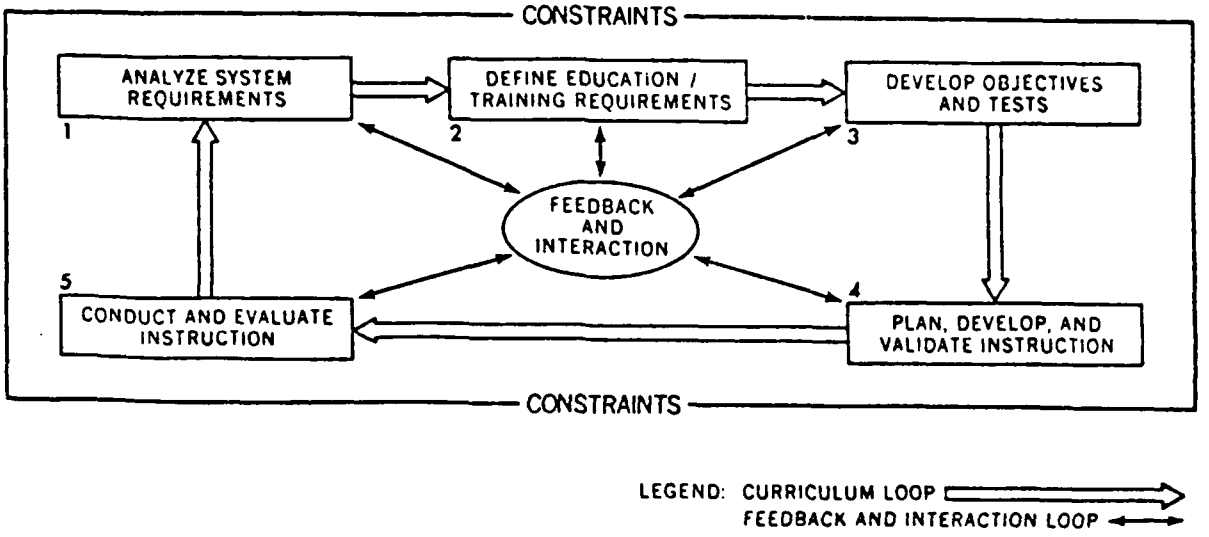


Figure 1. Five-Step Model (7:1-1)

Five-Step Model. Perhaps the most widely taught and used model within the AF is the Five-Step Model. This model, as depicted in Figure 1, is designed especially for the technical and job training programs used in the USAF. The process depicted in Figure 1 operates under environmental constraints for the particular training system. Such constraints include time, money, facilities, equipment, manpower, and the unit's mission. Instructors must recognize these constraints, overcoming them where possible and working around them when necessary, yet realizing that flexibility is permissible when using the Five-Step model.

Step 1, ANALYZE SYSTEM REQUIREMENTS, is the procedure by which human performance requirements are analyzed and documented by instructors when developing job training programs (8:1-3).

When performing task analysis, instructors may directly interact with workers, experts, or management by surveying, questioning, or observing them. Instructors may also analyze written material about the job, such as regulations, checklists, or technical data. Through such analysis, the instructor compiles a list of the knowledge, skills, behaviors, "duties and tasks," and "equipment and materials" required of workers to perform their jobs in a satisfactory manner (1:74). This list, known as the job performance requirements (JPR), forms "the base on which to design instruction and the frame of reference for evaluating instruction" (7:2-2).

At Step 2, DEFINE EDUCATION/TRAINING REQUIREMENTS, "the difference between the JPRs and the overall abilities" of potential students are compared (1:7-4). Any behavior listed in the JPR which potential students cannot already accomplish should be considered for training. The goal of this step is to select tasks for training, depending on numerous other considerations about the behaviors, including:

> consequence of inadequate performance; task delay tolerance (how fast the person must react to status); frequency of performance, complexity; difficulty of learning; and time between training and performance (1:7-4).

Further considerations such as "availability of instructors, equipment and facilities, long lead time resources, and time for training" are also part of identifying specific tasks for training (1:7-4, 7-5). When the specific tasks have been

identified for training, they are compiled into a set of instructional standards. As described by AFM 50-2, Instructional System Development,

> These instructional standards are specialized publications used to standardize and control instruction. They are also the means for coordination between those who are responsible for instruction and the organization for whom instruction is conducted. Such coordination helps to ensure that the instruction is designed to meet the using organization's needs. Instructional standards list, by means of task and knowledge statements, (is) the instruction needed to qualify personnel to do the job. These listings are the quantitative requirements to be met by the instructional system. Instructional standards are also qualitative. They show the level of proficiency to be developed for each task knowledge (7:3-7).

Instructional standards are the culmination of Step 2 of the model.

Step 3, DEVELOP OBJECTIVES AND TESTS, begins the process of quantifying the instructional standards into actual programs of instruction. At Step 3, instructors develop objectives for each of the instructional standards of the previous step. Objectives are specific statements labeling each behavior required of a student, the conditions under which each behavior must be accomplished, and the level of excellence or standards for accomplishment. These statements serve important purposes for both instructors and students. For students, objectives identify exactly what is required for successful accomplishment of a training program. The student can gear all study and practice toward accomplishment of the objective instead of non-essential behavior. For the instructor, one purpose of objectives is to

"serve as a basis for criterion tests" (7:4-3). Criterion tests, developed at this step of the model, serve as the basis for measuring the student's accomplishment of objectives. They often use the same wording as the original objectives. Criterion tests are not always written measures, however. A specific objective may require a student to physically demonstrate a behavior; for example, demonstrate ability to troubleshoot or fix a particular piece of equipment. The criterion test must therefore adapt itself to measure each objective, as specified by the objective. Other purposes of objectives for the instructor are to "serve as a basis for instructional technology decisions; determine appropriate content of the instruction (and) serve as a basis for instructional decisions" (7:4-3). These decisions are actually made by the instructor during Step 4.

Step 4 of the model is titled PLAN, DEVELOP, AND VALIDATE INSTRUCTION. There are three important aspects of planning instruction. One aspect is sequencing; objectives should be arranged "in the most effective sequence" which "produces required learning in the shortest time" (1:7-6). Common acceptable sequencing alternatives include arranging objectives in a simple to complex order, or in the order that the job requires (7:5-3). A second aspect of planning involves examination and decision by the instructor about methods by which students can progress toward achieving objectives (9:87). All ISD models encourage selection of student self-pacing and student

participation methods over "lock step" methods, where all students progress at the same rate (7:5-5). The third aspect of planning instruction involves selecting media. Media are "channels of communication" which provide the student with information for achieving objectives (9:87). The teacher is one particular medium through which students receive information; other examples include textbooks, programmed text, simulators, slides, videotapes, and computers. All of these "present material to the student, and when successful, make it clear and interesting so that the student learns" (19:29). Learning is further enhanced by selection of the medium or combination of media which not only give information about the objective, but also allow for student practice and evaluation in achieving the objective prior to the criterion test (7:5-5).

After planning the media, methods, and sequence of objectives, the instructor develops each in the form to be used for instruction. Other final courseware such as lesson plans, study guides, and Plans of Instruction are produced at Step 4 of the model. When final courseware has been developed, Step 4 recommends a tryout training program on a sample of potential students. This tryout compares "student performance against the performance criteria" of the objectives (7:5-14); in other words, it validates the training program (1:7-6). Such validation is recommended prior to formal implementation of the training program.

As training is formally implemented, the model moves into its final stage, Step 5 - CONDUCT AND EVALUATE INSTRUCTION. At this stage, the formal training program is conducted as a "student-centered, individualized instructional system" where instructors act as

> Managers of learning and fill the roles of classroom administrator, tutor, and counselor. They are now able to give much of their attention to the needs of the individual student (7:6-1).

Operation of the training, though based upon thorough analysis and a series of orderly decisions, is not allowed to stagnate. The training system must be constantly evaluated for deficiencies. The five-step model evaluates training programs both internally and externally as training is conducted. The purpose of internal evaluation is similar to validation - it allows the evaluator to judge whether the training system still enables the student to achieve the objectives. Internal evaluation thus monitors the performance of the students trained by the system (12:89). Additionally, "evaluation has an external function" which measures "not the attainment of objectives ... but the appropriateness of the objectives themselves." External evaluation thus examines whether the tasks required of the job for which the training system exists are still the same as when the original task analysis was performed (12:92). Both external and internal evaluation, combined with the conduct of training, provide a link from Step 5 to previous steps of the model. It implies flexibility in the model.

Flexibility is an important aspect of any ISD model. The five-step model demonstrates this flexibility in a number of ways. As shown by Figure 1, the five-step model is a never-ending process where the end links to the beginning. By demonstrating a never-ending process, the model accounts for a changing environment and provides a continued orderly fashion for redeveloping training based upon those changes. The model also demonstrates flexibility by explicitly linking all steps of the process through feedback and interaction (again seen in Figure 1). Feedback obtained at any step of the process enables the instructor to identify deficiencies or areas of enhancement for the training program. In accordance with the model, the instructor then uses the feedback information to identify and accomplish the steps which will improve the training program. Often, for example, instructors find inadequate objectives or test questions at Step 4 when they are validating instruction, thus requiring a brief return to Step 3. Finally, the model demonstrates its flexibility by requiring instructors to document their actions as they accomplish the process. Such documentation enables instructors to keep track of the interaction between the various steps; instructors can relate actions to previous actions and to objectives in developing a training system. The documentation also enables the various persons and organizational entities involved to coordinate and consolidate their efforts. As will be demonstrated throughout this research project, each of

these flexibility aspects are important not only to ISD theory, but also to practical implementation of ISD within operational missile units. Missile units have even extended the flexibility of the five-step model by applying it in conjunction with another model, Criterion Referenced Instruction (CRI).

CRI Model. The CRI model of Dr. Mager contributes to ISD theory in three ways: first, it adds goal analysis to ISD theory; second, it expands many of the procedures prescribed by the five-step model; and third, it presents information in a manner consistent with ISD theory.

One contribution of CRI to ISD theory is goal analysis. Goal analysis is related to task analysis since both identify areas of potential training. Unlike task analysis, however, goal analysis identifies cognitive areas of potential training, such as attitudes, rather than tasks or skills required by persons. It could be desired, for example, that individuals show "pride," "finesse," or "enthusiasm" in their work. Once such goals have been identified, it becomes the task of the instructor to quantify them. Goals must be subdivided into specific student performances which, if accomplished, indicate achievement of the goals. The CRI model recommends that the instructor ask the following question when quantifying goals: "If these performances were accomplished, would I be willing to say the goal has been achieved?" After identifying and quantifying goals

through goal analysis, the remaining procedures are similar to the five-step model (15).

CRI has been judged by at least one set of authors "to represent more of an expansion and clarification of specific ISD tasks and subtasks" than a departure from the five-step model (17:14). This "expansion and clarification" is a second contribution of CRI. Though the five-step procedure is not depicted, the same ideas are. For this reason, a detailed description of CRI procedures in this thesis would merely be repetitive.

The final contribution of the CRI model to ISD theory is its manner of presentation. ISD theory is presented in CRI courses and books in the same manner it recommends students or readers to develop their training programs; CRI, in other words, practices what it preaches. CRI books and courses begin with a set of objectives for the audience to achieve while they are in the process of learning about CRI. Organization of the CRI presentation from then on allows the audience to work towards achieving the objectives. First, necessary information about each specific objective is presented in the form of explanations, examples, or pictures. Other sources of information are usually also identified to the student. Next, the audience is given practice in achieving each objective; they are questioned about each objective as they practice, enabling each of them to self-measure progress. Correct answers indicate that a particular

member of the audience is capable of achieving the objective. On the other hand, incorrect answers necessitate additional information and practice, which the CRI book or course provides. As audience members complete practice at their own pace, each is presented with a criterion test as a final measure of ability in achieving the objective. By enabling the audience to apply ISD theory as it is presented to them, the CRI model appeals to the audience's emotions; if the procedures work when the audience is learning about the topic, the audience will be inclined to use the procedures when developing and conducting their own training programs.

Historical Basis of ISD Acceptance at SAC Missile Units.

Historically, both ISD and the training programs of the current SAC missile systems - *Minuteman* and Titan - originated during the 1960s. The timeframe of origin, however, was the only intersection between SAC missile unit training programs and ISD for a number of years. This trend of concurrent, but parallel development continued for a decade-and-a-half.

ISD originated mainly from the works of Dr. B.F. Skinner in the early 1960s. His advocacy of "systematic approach to training" and courses based upon instructional objectives were appealing to the commercial airlines. American Airlines thus adopted his theories in the 1960s and applied them successfully to pilot training. This successful application of ISD theory brought similar appeal to the USAF. In 1969, AFM 50-2,

Instructional System Development, was published, with its five-step model based upon Skinner's works (13). By 1980, the following USAF policies were dictated:

1. HQ USAF will promote the use of ISD in all MAJCOMs.
2. ISD will be applied to all new training programs.
3. ISD will be selectively applied to existing training and education systems when economically feasible (12:8).

It still was several years before missile units implemented ISD. From 1970 to 1977, missile unit training was characterized as lacking sound analysis of realistic conditions and standards for MCCMs (though a JPR did exist, as did a general "Proficiency Code Key"). Instead, "a fascination with the theoretically possible overshadowed realistic training and evaluation objectives" (14:4). Attempts were made to train MCCMs to higher skill levels than realistically required. An explanation for this was fear of the unknown by the missile units; fear of the unknown tasks, conditions, and standards that higher headquarters inspection agencies, such as the SAC Inspector General (IG) and the 3901st Strategic Missile Evaluation Squadron (SMES), would impose upon MCCMs when evaluating units (14:6).

Another higher headquarters inspection agency, however, began a reversal of the momentum of this circumstance. In 1977, the USAF IG criticized SAC for not applying ISD at the operational unit training programs (16). This criticism, by itself, was an important factor in SAC's acceptance and use of

ISD. The criticism foreshadowed, however, and provided a potential solution for overcoming the decline in crew member proficiency in SAC between 1977 and 1979. When it was determined in 1979 that "ineffective training programs" were among the causes of this decline, the ISD process, which was already in its initial stages in SAC, began its forward movement in earnest (14:7).

Initialization of the ISD process in SAC began with a re-analysis of the tasks applicable to Minuteman MCCMs by the HQ SAC training agency, the 4315th Combat Crew Training Squadron (CCTS). During this re-analysis in 1978, the 4315th CCTS subdivided each task into a list of short phrases which identified the functions or activities making up each task. After this list was provided to Minuteman units, it became the first set of performance objectives in SAC which could be used by both instructors and students to identify what was required of the task (16).

Though this set of performance objectives was useful, it was incomplete at the same time. It failed to prescribe standards for accuracy or timeliness of performance. To overcome this deficiency, a working group consisting of 3901st SMES and 4315th CCTS personnel was formed. In 1978 and 1979, this group developed a new Proficiency Code Key, identifying four skill levels for the MCCM:

- "Level 1" or "Entry Level" where the MCCM requires

demonstration and assistance to perform the task.

- "Level 2" where the MCCM requires assistance only on the more difficult activities of the task.
- "Level 3" where the MCCM can accomplish the entire task without error or assistance.
- "Level 4" where the MCCM performs the task "in established time parameters" without error or assistance (14:16).

This Proficiency Code Key was designed so that a specific skill level requirement could be applied to each specific task designated in performance objectives (16).

In 1979, the working group's emphasis shifted towards developing a set of Comprehensive Performance Objectives (CPOs) for the JPRs of each weapon system. Through a series of conferences at Vandenberg AFB, California, the working group and representatives of each SAC missile unit performed

> a complete task/subtask analysis. This included extensive research into Technical Order narrative and checklists, regulations that direct appropriate actions, and other documents that govern task performance (14:17).

The CPOs which resulted from this analysis were a more complete product than the original Minuteman performance objectives. The CPOs now specified for each weapon system a realistic set of tasks and subtasks required of crew members, the conditions under which tasks would be performed, and the standards of performance based upon the Proficiency Code Key (16). A sample CPO is

depicted in Table 2.1, and mechanics of the CPOs, as described in an Air Command and Staff College report by Major James D. Luethemeier, are shown in Table 2.2. Experts within the command regarded the CPOs as the result of Steps 1 and 2 of the Five-Step Model (22). Drafts of the CPOs were sent to the units in the fall of 1980, and were officially implemented in the form of SAC regulations by the end of the year (16).

Since the official implementation of the CPOs in 1980, job training at SAC missile units has been based upon realistic tasks with better defined standards, rather than the old "fascination with the theoretically possible." This is not say, however, that the CPOs have been without criticism or faults. Their refinement on several occasions since 1980 attests to their lack of infallibility as a missile training tool. The fact is, however, that since 1980 the CPOs have become the basic tool for ISD application at SAC missile units.

Missile Unit Training Personnel, Programs, and Their Environments.

Personnel and Programs. The persons responsible for developing and conducting such training are assigned to the Operations Deputate of the missile unit. Three sets of persons are:

Directorate of Training (DOTI) personnel: tasked with weapon system training.

TABLE 2.1

Sample CPO for a Titan Unit (6:3-159)

D06 Perform Security Alarm Situation Checklist		LEVEL 4 4 4 4
PERFORMANCE	**CONDITIONS**	**STANDARDS**
	Given T.O.-1, SACR 207-17, SACCEM 2-25, local directives, and under one or more of the following conditions:	C D B M
1. Recognize requirement to accomplish task	1. Alarm indications 2. Non-alarm indications a. IAW T.O.-1, fig 5-1	4 4 4 4 (within 3 minutes of status presentation)
	b. IAW SACR 207-17	4 4 4 4 (Within 5 minutes of status presentation)
2. Direct/process checklist actions a. Through step 2		4 4 2 2 (As stated in performance #3)
b. After step 2		3 3 2 2
3. Configure equipment and verify indications	1. CCBV a. Closes remotely	4 4 2 2 (within 1 minute after C/L initiation)
	b. Closes manually	2 2 4 4 (within 5 minutes after C/L initiation)
4. Notify agencies/personnel		3 3 2 2
5. Reconfigure equipment and exit C/L	1. A.R.T. investigation terminated	3 3 3 3

TABLE 2.2

The Mechanics of the CPOs (14:17, 19)

Level Designator. The level designator above the STANDARDS column identifies the highest level at which this task will be performed. It relates a task back to the Proficiency Code Key. For example, a Level 4 task may have the first subtask performed at Level 4 with all other following subtasks performed at Level 3. Normally, only one overall level number will appear for a particular crew position, however, a dual level appears if the JPR could be performed exclusively at one level or another depending on conditions presented. A Level 3/4 thus indicates that the highest level attained could be either 3 or 4 depending upon which listed conditions are presented.

Given Statement. The "Given ..." statement at the top of the CONDITIONS column specifies the nonvariable factors impacting upon the entire Comprehensive Performance Objective. It includes all associated materials such as technical data, regulations, other governing documents, and equipment hardware. Specific permanent hardware such as the MPT, LCC, equipment racks, and materials normally located where the crew member performs duty, are assumed to be present and functional unless otherwise indicated. The statement further includes possible methods of entry into the task and possible restrictions on problem presentation.

Performance Column. The PERFORMANCE column identifies all actions/decisions the crew member would be expected to take in performing the task. Performance listings can include such actions as recognizing the need to perform the task, configuring and reconfiguring equipment, monitoring the results to determine normal versus abnormal indications, and reporting results.

Conditions Column. The CONDITIONS column lists the conditions under which a crew member could be expected to perform each subtask. Only those conditions listed are considered appropriate for the performance being accomplished. The absence of any condition implies that the performance will always be required when accomplishing the task. With the listing of performances and conditions, the crew member, instructor or evaluator would be able to see, it was hoped, exactly what performance is expected under listed conditions for every JPR.

Standards Column. The STANDARDS column states the level at which each subtask must be performed. It is determined by the Proficiency Code Key. Any special standards, such as Level 4 time constraints, are spelled out.

EWO Training Branch (DO22T) personnel: teach SIOP procedures to MCCMs.

Codes Training Division (DO9) personnel: implement codes training.

Each set of persons differs in broad training responsibilities, yet produces the same specific types of training: recurring, MPT, supplemental, remedial, unit orientation or upgrade, and transition. Recurring training, conducted on a monthly basis, generally consists of self-study packages for all MCCMs to accomplish at launch facilities, followed by classroom sessions in a training facility at the base. Similar to recurring training with respect to its regularity for all MCCMs (though on a quarterly basis rather than monthly) is training at the MPT. MCCMs receive realistic, hands-on experience for procedures which cannot be performed regularly at the launch facility, yet are essential to mission accomplishment. This training includes, for instance, missile launch or hazard procedures.

Supplemental training, the third particular type, is presented on a non-recurring basis. This training is provided to all MCCMs when a change occurs that has an important immediate impact on weapon system or procedures. It also is often used to correct a significant deficiency in training or when numerous MCCMs have been identified as using incorrect procedures. Fourth, remedial training is also presented on a non-recurring basis to individual MCCMs with the purpose of correcting a

deficiency in knowledge or procedures. Unit orientation training (Minuteman units) or upgrade training (Titan units) is the fifth particular type, and is used to familiarize and qualify new MCCMs on the unique mission, capabilities, and peculiarities of the unit upon their arrival after a generalized introduction to SAC MCCM procedures at the 4315th CCTS. Finally, transition training enables selected MCCMs to develop skills necessary to command a missile combat crew.

Other persons within the Operations Deputate impact upon this training. Since MCCMs are training recipients, ISD-developed training must be centered upon their job needs. Standardization/Evaluation Division (DOV) personnel are tasked with evaluating MCCMs at the missile complex and the MPT. In doing so, DOV personnel provide feedback on the quality of job training. DOV additionally participates in the review and coordination process prior to approval of key training programs. Another key person, the Chief, Instructional Systems Management Division (ISMD) (formerly called the Wing Instructional System Manager), coordinates and guides all matters of training and evaluation in accordance with the ISD process. Though ISMD is typically a one or two person division, it has broad responsibilities within the deputate:

- Help ensure effective instructor and evaluator training programs.
- Advise instructors on lesson plan preparation and test construction.
- Advise evaluators on evaluation script preparation.
- Review all instruction and evaluation material to ensure program quality and effectiveness.

- Periodically monitor classroom and MPT instruction and evaluation periods to ensure program objectives are met.
- Coordinate on all DOT and DOV training and evaluation scripts to ensure compliance with CPOs.
- Serve as a focal point for all 4315th CCTS formal training ... (10:3).

In discharging these responsibilities, ISMD educates instructors, evaluators, and staff members on "the benefits gained from following the ISD model" (10:1). The Chief, ISMD, also serves as an advisor to the Deputy Commander for Operations (DO) in training and evaluation matters. Such advice enables the DO to provide overall policy and leadership within the Deputate.

Environment. Agencies outside the Operations Deputate also impact MCCM job training. At the missile unit, these agencies include the Wing Commander and his staff, the Unit Command Post, the Maintenance Deputate, the communications and civil engineering squadrons, the Security Police, and the Wing Safety Office. Each of these agencies interacts with MCCMs in daily operations. Policy, procedures, or equipment changes affecting such agencies often also affect MCCMs and require training. Additionally, the daily interaction enables these agencies to provide important feedback on MCCM capabilities and deficiencies.

Outside the missile unit are higher headquarters agencies whose policies and regulations impact MCCM job training. Headquarters USAF establishes policy regarding ISD in AFR 50-8, Policy & Guidance for Instructional System Development.

As a reminder, it was criticism provided by the Headquarters USAF inspection agency, the IG, which began the ISD wheels turning in SAC in 1977 (16). SAC, as the major command responsible for missile units, provides the greatest impact on MCCM training. Its impact is discussed below, subsequent to identification of two other higher headquarters agencies, Numbered Air Force and Air Division. Generally, both of these agencies provide staff assistance to missile units in implementing the training policies of the AF and SAC.

Headquarters SAC impacts every aspect of MCCM job training. Its training agency, the 4315th CCTS at Vandenberg AFB, California, provides a continuous pipeline of new MCCMs to the missile units through Initial Qualification Training. Manned by experienced former missile unit instructors and evaluators, 4315th CCTS also offers four formal courses on developing, conducting, and evaluating training, including: the SAC Missile Instructor Course, Criterion Referenced Instruction Training (CRIT), the Mini-CRIT course, and the Wing Instructional Systems Manager Training Course. A description of each course can be found in Appendix A. Each course is available at specified times upon request of the missile unit. The only persons, however, required by regulation to attend any of these courses are ISMD personnel. SACR 55-66, Volume I, ICBM Operations, requires them to attend the Wing Instructional System Manager Training course.

Several SAC regulations impact the daily training activities of the missile unit. One regulation governs each broad category of training:

- SACR 50-16, Volume I, ICBM Training, governs weapon system training.
- SACR 50-21, ICBM EWO Training Programs, governs EWO training.
- SACR 55-56, Volume I, Control of Minuteman Code Components, governs Codes training.

Furthermore, there are regulations specifying the duties and tasks of two other major actors within the missile unit:

- SACR 55-66, Volume I, ICBM Operations, defines duties of ISMD personnel.
- SACR 55-66, Volume II, ICBM Combat Crew Standardization and Evaluation, prescribes detailed procedures for Stand/Eval personnel in conducting evaluations.

Finally, SACR 50-16, Volumes IV through XIII, are the CPOs which set standards for MCCMs, and thus are the basis for training and evaluation.

Headquarters SAC inspection agencies, the 3901st SMES and the SAC IG, enforce these regulations and assess the quality of MCCM job training in conjunction with regular inspections of the missile units. A specific item of evaluation for each agency is the unit's compliance with SAC regulations; MCCM job training is evaluated for compliance with the regulations listed above. Both

inspection agencies also evaluate MCCMs at the MPT and missile complex as a measure of the technical quality of MCCM training. The SAC IG additionally evaluates above and beyond regulation compliance or technical quality; it evaluates the management practices of the actors involved in MCCM job training. Results from both IG and SMES inspections are recorded, then forwarded to all SAC missile units. SAC thus maintains an environment of continuous feedback to its missile units in an effort to improve the quality and usefulness of MCCM job training.

Usefulness of ISD

Benefits and problems which surround the application of ISD are valuable measures of its usefulness. Information of this nature on missile units is scarce; however, Major Luethemeier, the author of an Air Command and Staff College report cited previously, provides a summary of the benefits and problems of the CPOs in his research report. According to Major Luethemeier, the CPOs "demonstrate the command's view of realism," thus are a beneficial basis for all training and evaluation. In addition, the standardization and training divisions benefit from improved relations because of the common "focus" provided by CPO standards (14:33). On the other hand, Major Luethemeier cites missile unit dissatisfaction with specific Level 4 time standards as a problem of the CPOs. Because Level 4 standards are the results of a "best estimate" of missile experts without additional testing, some are felt to be "incorrect or inappropriate time periods."

There is also concern that the standards "inhibit trainer/ evaluator judgement; distract crew members; and convey the wrong signal, emphasizing speed rather than correct action" (14:35).

Though other specific information on missile units is scarce, a brief examination of the benefits and problems surrounding the application of ISD at training units may provide insight into similar circumstances at the missile units.

Benefits. The continuing appeal of ISD to the Air Force stems from the following results of its application:

1. Reduction of training time. Since the implementation of ISD, the average course length in the Air Force has been reduced from 16.8 weeks in 1970 to 13 weeks in 1978 (12:3). This result stems from task analysis which enables instructors to identify and train only necessary tasks.

2. Reduction of costs. Student time is considered to be "the largest component of the cost of technical training" (12:20). With a reduction in training time, student time has also been reduced. Therefore, training costs for the AF peaked in the early 1970s and continued to drop through 1979 (12:8).

3. Better student quality. General consensus within the training profession is that the student-centeredness of ISD promotes improvement in "student performance, motivation, and learning rates" (12:63).

4. Flexible guidelines for the instructor. ISD models guide instructors through a systematic, but flexible process.

They enable instructors to develop training programs in an orderly, rather than haphazard fashion.

Problems. Significant problems, however, are also encountered by training units in the application of ISD:

1. Time-consuming training development. Though course length has been reduced, the time spent by course developers has increased since the implementation of ISD. Task analysis and training documentation are contributors to this problem. In some cases, it has been necessary to spend as much as five years developing training programs (20:3). One resultant tendency has been for instructors to circumvent the process by developing shortcuts (17:16). There is also some tendency to apply ISD for only a portion of training because of this problem (17:42).

2. Complex nature of ISD. ISD is systematic and flexible, but application of any ISD model requires thorough procedural knowledge. Insufficient knowledge often leads to overemphasis or premature selection of media and a lack of proper analysis, validation, and evaluation (17:17). An obstacle for many instructors is the development of concise, understandable objectives which can be measured (12:39). Tests are also an obstacle; to be valid, each must measure the specific conditions, performances, and standards specified by the objectives (12:91).

3. Management support, agency cooperation. Successful ISD implementation requires close management attention. Any lack of cooperation or support between agencies hinders the process.

Though training development is time consuming using ISD, instructors often complain about "exhortations from higher headquarters to get on with it" (12:84). Constant turnover of military personnel results in instructors who lack training and experience in performing ISD tasks (20:10). ISD teams developing training are often undermanned, yet team members are required to conduct training or perform additional duties at the same time (17:44-45). There are also "synchronization problems"; various training agencies must be brought into the process at different times to perform different tasks (12:41).

4. Environmental Impact. Weapon and support systems continuously evolve due to technological advancement and problem resolution. Procedural changes are common for such systems, and technical data is revised often. Training programs based upon these systems therefore encounter a "seemingly endless series of changes and updates" (18:330) which "send reverberations throughout ISD. Revisions to audiovisual material can consume up to 60 percent of original time and costs" (17:30).

5. Student problems. Even though a perception of enhanced student quality exists, there are student-related problems with ISD. "Many students find it difficult to adjust immediately to the flexibility, options, and increased freedom" of ISD training programs (12:53). More significantly, however, has been the growing concern that ISD-developed training programs lack sufficient theoretical information or reinforcement practice to

enable long-term retention when students have graduated. The emphasis on student achievement of specific objectives within ISD enables students to not only "absorb the material very quickly" and "pass a test," but also "forget it very quickly" (20:8).

Significance to Missile Units. It is not specifically known whether missile units encounter the same benefits and problems from ISD as do training units. The previous discussion, however, provides a framework for later measurement of the benefit and problems of ISD at the missile unit.

Summary and Conclusion

This chapter has examined numerous sources of information to provide a background summary on the Five-Step and CRI ISD models, as well as the potential problems and benefits of such models. Within the framework of this background summary and the research questions presented in the previous chapter, a data collection survey was developed. Development of the survey is explained in Chapter III of this research project. Other background material presented in Chapter II - the history of ISD acceptance within SAC, and the identification of missile unit personnel, programs, and environments - formulated a basis for understanding the data colleted by the survey. Chapters IV and V analyze and draw conclusions from the results.

III. Methodology

Overview

The survey method was used in this thesis to collect specific information related to the research goal and questions. The necessity of using a survey for this purpose stemmed from the lack of specific literature or data related to operational units, especially missile units, as previously described. It therefore is the purpose of this chapter to detail factors relevant to the survey, including: the population sampled by it; its construction, refinement, and implementation; the method of analyzing survey results; and limitations of the survey.

Survey Sample

The implementers of ISD at the missile units, those persons who develop and conduct training programs, were in the best position to provide data toward the goal of this research. For this reason, personnel from ISMD, DOTI, DO22T, and DO9 at each of the eight SAC missile units were selected as intended recipients of the survey.

The original intention was to survey the entire population from these divisions, a population estimated to be between 220 and 240 persons. As the methodology for this research was being developed, however, Headquarters (HQ) SAC began its own reassessment of the CPOs. It feared that a census for the purpose of this research report could lead to expectations of

change on the part of those surveyed, thus interfering with its reassessment. This concern was alleviated by reducing the intended number of survey recipients to the minimum who could provide sufficient data to enable attainment of the goal of this research.

TABLE 3.1

Stratified Sampling Plan for This Research

Division / Wing	ISMD	DOTI	DO22T	DO9
44 SMW (Ellsworth)	1*	1	1	1
90 SMW (F.E. Warren)	1	1	1	1
91 SMW (Minot)	1	1	1	1
308 SMW (Little Rock)	1	1	1	**
321 SMW (Grand Forks)	1	1	1	1
341 SMW (Malmstrom)	1	1	1	1
351 SMW (Whiteman)	1	1	1	1
381 SMW (McConnell)	1	1	1	**

* Number of people surveyed
** DO9 does not exist at these units

Table 3.1 depicts a stratified sampling plan which provided sufficient data towards research goal accomplishment, yet kept

survey recipients to a minimum. Under this sampling plan, one key person within each training division at each unit was surveyed. A key participant at every unit was the Chief, ISMD. As the coordinator of the ISD process at the missile unit, the Chief, ISMD, provided valuable facts and opinions regarding survey topics. Each Chief, ISMD, was also requested to recommend, for the purpose of survey participation, the names of cadre who implemented ISD for other divisions. With this method for choosing survey participants, there was relative assurance that facts and opinions collected would provide a valid picture of the ISD process at the missile unit. The total number of participants surveyed under this plan was 30.

The Survey Instrument

Communication Modes. Two communication modes, telephone and mail, were chosen to conduct the survey. The primary mode of communication chosen was the structured interview, conducted by the researcher via the telephone. This choice was based upon significant advantages it offered to the researcher, including:

- A great deal of control. In fact, telephone interviews offered the greatest degree of control for the researcher, short of traveling to each missile unit for face to face interviews. It ensured that persons interviewed would not misinterpret questions and provide worthless data.
- Development of a dialogue which enabled meaningful, two-way communication.

- Immediate feedback to the researcher, rather than waiting for results which could sometimes be delayed by mail.

Though the mail survey method did not offer any of the above advantages, it was chosen as a backup. It was recognized that in certain instances, persons did not want to be interviewed by phone, especially when they were constantly busy during the day or when working in a division where classified information was typically discussed (i.e. DO22T and DO9). While mail surveys were necessary, they were limited to instances such as those above when the data could not be gathered by phone.

Construction of the Survey. The two different communication modes necessitated that two survey instruments be developed: a telephone interview schedule (located in Appendix B) and a mail questionnaire (located in Appendix C). Both instruments, however, were similar in nature - their survey questions were constructed based upon five considerations. Reliability, the "degree" to which the survey questions supply "consistent results," was one consideration (11:132). Reliability was promoted by asking the survey questions "the same way," using a "standardized format and sequence" (11:215). Brevity, a second consideration, was necessary to minimize the additional burdens placed upon the schedules of the persons being surveyed. In the interest of brevity, surveys were developed such that most persons would complete them in 30-50 minutes, whether by phone or by mail. A third consideration was the introduction to the survey. It was carefully designed to

identify purpose and structure, while making the recipient feel comfortable in participating. Consideration number four was to gather some elements of background information from each recipient. Such information would be used to prevent excessively broad conclusions about data gained from the sample. Background information was gathered in Part I of both the interview schedule and the questionnaire (see Appendices B & C). The last consideration, perhaps the most important one, was survey content - it had to be focused toward a specific purpose in order to be meaningful for this research. Survey questions were therefore developed using information from Chapter II of this research project as the basis for specific measurement of the research goal and questions in Chapter I. This purposeful development is demonstrated in Table 3.2. There was no reason to believe that any particular order of questions was necessary; therefore, survey questions were ordered in the same manner as the research questions presented in Chapter I.

TABLE 3.2

How Survey Questions Focus Upon The
Original Research Goal and Questions

Research Goal

Develop a detailed description of ISD as it relates to developing and conducting job training for MCCMs at operational SAC missile units.

Research Question #1

Is any particular ISD model, combination of models, or component parts used at the missile unit?

- Measured by survey questions in Parts II and III of both the telephone interview and the mail questionnaire. (Refer to Appendices B and C for verification.)
- The "ISD-Related Methodologies" section in Chapter II of this research project was used to build these survey questions.

Research Question #2

What are the perceived problems/benefits of using ISD to develop and conduct job training?

- Measured by survey questions in Parts IV and V.
- The "Usefulness of ISD" section in Chapter II was used to build these survey questions.

Further Examination of the Survey Questions. Responses were solicited in four ways: through open-ended questions, checklist questions, questions with four-point scales, and questions with five-point scales. Open-ended questions usually suggested that the respondent identify examples of applications at the missile unit which corresponded to specific elements of ISD theory. Respondents were permitted to provide multiple examples of such applications. Telephone interview schedule

question numbers 4, 6, 10, 13, 16, 17, 26, and 29 were open-ended, as demonstrated in Appendix B (numbers 6, 8, 12, 15, 18, 19, 28, and 31 in the mail questionnaire of Appendix C).

A checklist format was used as a second method of response solicitation. Telephone interview schedule questions 1, 2, 18, 27, and 28 (and 3, 4, 20, 29, and 30 of the mail questionnaire) used this format. Each of these questions suggested response categories from which the respondent could choose. Like open-ended questions, checklist format questions usually allowed multiple responses, as well as the opportunity for the respondent to provide information not already listed on the survey.

Four-point scales provided yet another way of soliciting responses. It was the objective of these scales to obtain an estimate of how often particular steps or aspects of ISD theory were used at the unit. In all but one question involving four-point scales, respondents were instructed to choose from the following:

a. Often

b. Sometimes

c. Never

d. Don't Know

Questions 3, 5, 7, 8, 9, 11, 14, 15, 19, and 20 of the telephone interview schedule (5, 7, 9, 10, 11, 13, 16, 17, 21, and 22 of the mail questionnaire) used this particular four-point scale. A variation of this scale was used in question 12 of the telephone

interview schedule (number 14 in the mail questionnaire). Potential responses listed in this question were:

a. Student self-pacing is used more than lecture

b. Student self-pacing and lecture are used equally

c. Lecture is used more than student self-pacing

d. Don't Know

Both of these four-point scales implied a rank order of the response alternatives; alternative "a" in each of these scales ranked closest to recommendations of ISD theory, while the opposite was true for alternative "c." Each of these scales also implied a continuum between alternatives "a" and "c," but forced the respondent to choose the alternative which most described his thoughts on how often a particular theoretical aspect of ISD was applied. For example, there were instances when a respondent replied "b. Sometimes" to a question, but clarified this response with an additional comments such as "seldom." Unlike the other alternatives, there were nc implications of rank or continuum with alternative "d. Never." Alternative "d" was nevertheless included to accommodate the fact that some persons were not totally knowledgeable about ISD applications at their unit.

The final manner of response solicitation was through five-point scales. Five-point scales were used to measure the strength of a respondent's opinion regarding benefits and problems of the CPOs. The opinions of the respondents were solicited in accordance with the following continuum:

a. Strongly Agree

b. Agree

c. Uncertain

d. Disagree

e. Strongly Disagree

This continuum was used in the construction of questions 21 through 25 of the telephone interview schedule (23 through 27 of the mail questionnaire).

Refinement and Validation of the Survey

Upon construction, the survey underwent a refinement process. This refinement process, designed to ensure its effectiveness as a measurement instrument, began with a survey tryout on three former developers of missile training at the Air Force Institute of Technology. Feedback was obtained on particular aspects such as wording and order of questions within the interview schedule.

Validity was another important consideration; the interview schedule had to:

- "provide adequate coverage of the topic under study" (11:129).
- ensure that its measurements "reflected true differences among those being tested" (11:128).

For instance, did measurement of problems/benefits ensure adequate coverage, and at the same time, reflect true differences in ISD usefulness at that unit? Validity was tested in two ways: first, the interview schedule was reviewed by three ISD experts at HQ SAC; then, a trial survey was conducted at the 381st SMW,

McConnell AFB, Kansas, on eight persons similar to those actually surveyed later. While the survey was judged valid by everyone who participated in the tryout, the process resulted in a few grammatical changes to the mail questionnaire, and the insertion of statements in both survey communication modes to allow for comments by the participants after any questions.

Survey Implementation

Survey implementation followed the refinement process. Interviews were conducted in June and July of 1985. Responses recorded from each participant are shown on a question-by-question basis in Appendix D. The names of persons have not been explicitly identified in the appendix in order to preserve anonymity.

Data Analysis

Though actual analysis of the responses listed in Appendix D is deferred until Chapter IV, an explanation of analysis methodology is in order. For the purpose of this research, analysis was a relatively simple exercise. Similar responses for each question were grouped together, counted, and recorded in a tabular column under the heading "Frequency." In addition, the percentage of persons responding with the same answer for each question was calculated. Each result was recorded in a column headed "Relative Frequency." This tabular combination of columns, known as a "Frequency Table" and depicted in Table 3.3, became the basis for analysis of each survey question/response.

TABLE 3.3

An Example of a Frequency Table
For Telephone Interview Schedule Question 21
and Mail Questionnaire Question 23

Response	Frequency	Relative Frequency
Strongly Agree	9	30
Agree	19	63
Uncertain	1	3
Disagree	1	3
Strongly Disagree	0	0

Comments regarding a particular survey question were sometimes directed toward the mode of the frequency table (the response most frequently given by those surveyed). The mode was a good indicator of the respondents' opinions or methods when there was a relatively unequal distribution of responses within the frequency table. When two or more responses were nearly equal in frequency for the same survey question, however, the significance of the mode as an indicator declined. It was therefore necessary to direct comments toward more than one response category for many frequency tables. In addition, comment was generally required for each response in the frequency tables based upon replies to open-ended questions. The author of this research report judged all the responses to open-ended questions as valid, based upon his own experience at the missile unit.

While analyzing every individual frequency table in this manner, there were also occasions in which it was beneficial to analyze combined groups of frequency tables. This was particularly true of those frequency tables pertaining to research question one, originally stated in Chapter I:

> Is any particular ISD model, combination of models, or component parts used at the missile unit?

Thus, the frequency tables analyzed in groups were drawn from "Part II: Five-Step Model" and "Part III: Criterion Referenced Instruction Model" of the survey.

The frequency tables analyzed in groups were further limited to those containing the four-point scales discussed previously, because analysis involved calculation of a mean (average) score. While this did not include every frequency table pertaining to the Five-Step or CRI Models, the information provided by those questions with four-point scales was sufficient to demonstrate how often missile unit instructors apply theoretical aspects of each model. Mean scores were calculated to make inferences about: application of individual steps within the Five-Step Model, overall use of that model, overall use of the CRI Model, and combined use of the two models.

The calculation of mean scores began by assigning an arbitrary value to three of the response categories within the four-point scales. Table 3.4 shows the value assigned to each response category. The "Don't Know" response category was not assigned a value, because, as discussed previously, it was not a

valid member of the continuum formed by the other responses. For this reason, any person responding with a "Don't Know" answer was not included for the purposes of calculating a mean score. The number of persons responding to any other response category, however, was multiplied by the value assigned to that category, then divided by the total number of responses to obtain the mean. This resultant score provided a simple basis for verbal comment about groups of frequency tables, because it would correspond closely to one of the original response categories.

TABLE 3.4

Arbitrary Rank Assignments For Each Response Category In the Four-Point Scales

Scale 1	Scale 2	Value
Often	Student self-pacing is used more than lecture	2
Sometimes	Student self-pacing and lecture are used equally	1
Never	Lecture is used more than student self-pacing	0
Don't Know	Don't Know	None

Limitations of This Methodology

The relative simplicity of the analysis technique was a definite advantage of the methodology described in this chapter. This advantage, however, was offset by three limitations which detracted somewhat from the overall ability of the research report to make inferences:

1. The four-point scale used to calculate mean scores lacked an absolute term such as "Always" at the top of the scale to oppose "Never" at the bottom. Because this term would have been assigned the highest value at the top of the scale, its inadvertent deletion has most likely caused a slight reduction in mean scores. The responses and scores most likely distorted from this deletion will be noted in Chapter IV.

2. The lack of any four-point scales for questions involving the last step of the Five-Step Model has hindered accomplishment of a complete mean score analysis for this model. Unfortunately, mean score analysis was recognized as a useful technique after construction and implementation of the survey.

3. The survey sampling plan did not include enough participants to make inferences about the total population with any statistical confidence. Statistical tests, for instance, could not be used to ascertain whether differences in survey response could be attributed to differences in a person's experience, division, unit, or level of ISD training.

Despite these three limitations, the author of this research report is confident that valid, valuable information has been obtained using the methodology described in this chapter. The third limitation has been overcome to a large extent by the fact that survey participants were among the cadre who implemented ISD at the units. While the second limitation has been impossible to overcome, there still were enough four-point scales to analyze most of the Five-Step Model using mean score analysis. Finally,

though mean scores have been slightly distorted by the first limitation, their validity as overall measures of the use of ISD models can be confirmed using logic when actual results are analyzed in Chapter IV.

Summary

This chapter has provided details of a survey constructed to answer research questions posed in Chapter I. In addition, it has described a method of analysis for responses to the survey, based mostly upon frequency tables, but also upon mean scores for limited groups of questions. Finally, it has listed three important factors which limited the ability of this research report to make inferences to a certain extent, but nevertheless, were factors which did not distract from overall achievement of the research goal. Chapter IV analyzes actual responses to the survey based upon the methodology described in this chapter.

IV. Analysis of Survey Responses

Overview

Responses obtained from each survey question, as recorded in Appendix D, are analyzed in this chapter. For the purpose of analysis, survey question/responses are categorized, like the survey instruments, into five headings:

- Background Information
- Five-Step ISD Model
- Criterion Referenced Instruction (CRI) Model
- Problems and Benefits of the CPOs
- Problems and Benefits of ISD in General

Questions categorized under each particular heading are analyzed on an individual basis. The analysis of each question begins with a frequency table which summarizes the responses to that particular question. Below the frequency table on each page of analysis, the question is restated from the survey and comments pertaining to the results are provided. In an effort to promote brevity within the chapter, only the question numbers for the telephone interview schedule are mentioned. If the reader desires to refer to the mail questionnaire at any point during this analysis, its question number can be found by adding two to the appropriate telephone interview schedule question number. Mean score analysis is also presented as necessary during discussion of the Five-Step and CRI models.

Background Information

Telephone Interview Question 1: How much experience have you had developing or conducting instruction at your unit?

TABLE 4.1

Frequency Table for Telephone Interview Question 1

Response	Frequency	Relative Frequency
Less than 6 months	1	3%
At least 6 months but less than 1 year	2	7%
At least 1 year but less than 1 1/2 years	4	13%
At least 1 1/2 years but less than 2 years	3	10%
2 years or more	20	67%

Two thirds of the survey participants responded that they had two or more years of developing and conducting instruction at the missile unit (see Table 4.1). This result was not surprising, since the participants were among the cadre in implementing ISD there. It was interesting to note, however, that only one of the six participants from the Codes Division (DO9) had this much experience.

Telephone Interview Question 2: What instructor training have you accomplished?

TABLE 4.2

Frequency Table for Telephone Interview Question 2

Response	Frequency	Relative Frequency
Locally developed unit training	28	93%
SAC Missile Instructor Course	19	63%
Criterion Referenced Instruction Training (CRIT) Course	8	27%
Mini-CRIT Course	5	17%
Wing Instructional Systems Manager Training Course	7	23%
Academic Instructor School	6	20%
ATC ISD Courses	6	20%
ECI Course: Principles and Techniques of Instruction	5	17%
College Courses	2	7%

This question presented a checklist of possible responses for survey participants, but also allowed them the opportunity to provide additional information. Response to the checklist item, "Locally developed unit training" was almost unanimous, and nearly two thirds of the respondents have taken the SAC Missile Instructor Course as shown in Table 4.2. The large number of responses in each of these two categories is probably due to the

fact that both types of training can be accomplished at the missile unit. The extent to which courses offered outside the missile unit have been attended by survey participants is not nearly as great; however, the combined total of persons who have attended either the Criterion Referenced Instruction Training Course or the Wing Instructional Systems Manager Training Course constitutes 50 percent of the respondents. The significance of combining totals from these two training categories stems from the fact that both courses conduct exactly the same training for approximately three weeks. The Criterion Referenced Instruction Training Course then concludes after three weeks while the Wing Instructional Systems Manager Training Course presents other training specific to the duties of ISMD personnel (see Appendix A for a detailed description of each course).

Five-Step ISD Model

Telephone Interview Question 3: Does your unit accomplish task analyses similar to Step 1 in order to produce a list of the knowledge, skills, behaviors duties, and tasks required of missile combat crew members?

TABLE 4.3

Frequency Table For Telephone Interview Question 3

Response	Frequency	Relative Frequency
Often	7	23%
Sometimes	16	53%
Never	7	23%
Don't Know	0	0%

This question and the responses shown in Table 4.3 began the discussion of the Five-Step model's first step, ANALYZE SYSTEM REQUIREMENTS. A slight majority of the survey participants responded that task analysis was accomplished only sometimes. The minority of participants who responded otherwise were equally distributed in their answers: half reported that task analysis was performed often while the other half claimed that it was never done. Analysis of the next survey question provided additional insight to responses for this question.

Telephone Interview Question 4: Are you aware of any product within your unit or SAC which can be regarded as the result of Step 1? If so, please specify.

TABLE 4.4

Frequency Table for Telephone Interview Question 4

Response	Frequency	Relative Frequency
CPOs and/or JPRs	25	83%
New systems or procedures introduced to unit (i.e., 616A SLFCS; crew maintenance of launch control center)	6	20%
Task analysis performed on an existing training program (i.e., Transition Training)	3	10%

This was an open-ended question which permitted multiple responses from survey participants. An overwhelming majority of participants replied that the CPOs and/or the JPRs were the documented products of a task analysis within SAC (Table 4.4 above). Since a comprehensive task analysis had already been performed for them by HQ SAC, most participants saw little need to accomplish task analysis on their own. The need for task analysis generally arose when new systems or procedures were introduced to the missile unit, or upon revamping of an existing training program.

Telephone Interview Question 5: Does your unit accomplish the tasks listed in Step 2 in order to produce a set of instructional standards?

TABLE 4.5

Frequency Table for Telephone Interview Question 5

Response	Frequency	Relative Frequency
Often	11	37%
Sometimes	13	43%
Never	6	20%
Don't Know	0	0%

This question was designed to solicit responses about the frequency of use of Step 2, Define Education & Training Requirements. Responses to the question were evenly distributed between "Often" and "Sometimes," with about half as many participants responding "Never" as compared to the other two categories (see Table 4.5). While conclusive inferences cannot be drawn based upon this distribution of responses, such a distribution nevertheless indicates less than frequent accomplishment of Step 2 by missile unit instructors, especially if the "Sometimes" and "Never" categories are combined. Further confirmation of this inference might be in the fact that survey participants from ISMD, the group generally considered within SAC

to be most knowledgeable of the ISD process, unanimously replied that Step 2 was merely accomplished "Sometimes."

Telephone Interview Question 6: Are you aware of any product within your unit or SAC which can be regarded the result of Step 2? If so, please specify.

TABLE 4.6

Frequency Table For Telephone Interview Question 6

Response	Frequency	Relative Frequency
CPOs and/or JPRs	21	70%
Step 2 tasks performed on new systems or procedures introduced to unit (i.e., 616A SLFCS, crew maintenance on launch control center)	6	20%
Step 2 tasks performed on existing training program (i.e. Transition Training or programmed text)	3	10%
Local training regulations, Plans of Instruction, or lesson plans	7	23%
Other SAC Regulations (i.e., SACR 50-16, Vol I or SACR 50-21)	2	7%

An indication of the on-going nature of first two steps of the Five-Step model was demonstrated by responses to this question. Three of the five response categories in Table 4.6 are identical to those for the question on the products of Step 1. The implication of one of the remaining response categories is that local training regulations, Plans of Instruction, or lesson

plans are used to document the results of Step 2 when it is accomplished at the unit. SAC also documents other training requirements in its regulations, as indicated by the last response category.

Telephone Interview Question 7: Does your unit use written objectives as the basis for training?

TABLE 4.7

Frequency Table for Telephone Interview Question 7

Response	Frequency	Relative Frequency
Often	30	100%
Sometimes	0	0%
Never	0	0%
Don't Know	0	0%

This question began the discussion of Step 3 of the Five-Step Model, DEVELOP OBJECTIVES AND TESTS. A unanimous response was obtained: training has often been based upon written objectives (see Table 4.7). An additional comment, "Always," was provided by a few participants. This additional comment, combined with the unanimous responses led the author of this research report to suspect that a response category "Always" would have been chosen on a wide basis had it been offered as an alternative.

Telephone Interview Question 8: Written tests at your unit are based upon specific objectives.

TABLE 4.8

Frequency Table for Telephone Interview Question 8

Response	Frequency	Relative Frequency
Often	25	83%
Sometimes	5	17%
Never	0	0%
Don't Know	0	0%

While not unanimous in their opinions, survey participants overwhelmingly chose the "Often" category once again, as shown in Table 4.8. Once again, additional comments offered by the participants led to a suspicion that an "Always" category would have been selected by many.

Telephone Interview Question 9: MPT scripts produced by your unit are based upon specific objectives.

TABLE 4.9

Frequency Table for Telephone Interview Question 9

Response	Frequency	Relative Frequency
Often	30	100%
Sometimes	0	0%
Never	0	0%
Don't Know	0	0%

For the third simultaneous question, it is suspected that an "Always" response category would have been widely selected, since 100 percent of the participants actually chose the "Often" response (Table 4.9). By this point in the analysis, it is also obvious that objectives play an extremely important part in developing and conducting training at the missile unit.

Telephone Interview Question 10: Please cite examples of criterion tests used by your unit which require actual demonstration of the student's performance.

TABLE 4.10

Frequency Table for Telephone Interview Question 10

Response	Frequency	Relative Frequency
MPT scripts	28	93%
Remedial or Individual improvement test	4	13%
Quarterly EWO test	3	10%
Learning center scenario (accomplish procedures on mock-ups)	7	23%
EWO tape testing	3	10%
Performing procedures on some on-site equipment (i.e. biopack donning, weather corridor plotting, platform raising and lowering, and escape hatch opening)	5	17%

MPT scripts are regarded as criterion tests by 93 percent of survey participants, because the scripts require students to perform actual procedures in a Launch Control Center (LCC) simulator. None of the other responses shown in Figure 4.10 were offered by a majority of the participants for this open-ended question; however, it is likely that all are valid examples of criterion tests. Learning centers at most missile units are mock-ups of the LCC, and though less sophisticated simulators

than the MPT, are places where the student can demonstrate accomplishment of certain crew procedures. All MCCMs are also required to demonstrate competence using equipment located at the launch facility, either during training alerts or Standardization Evaluations, or both. MCCMs who fail to demonstrate competence at any particular task are often provided remedial practice performing the tasks until it can be accomplished correctly. Finally, EWO tape testing and quarterly tests can be considered as criterion tests which require actual demonstration of the student's performance: tape testing because students are required to copy and decode Emergency Action Messages as they would at the launch facility; and quarterly tests because they perform calculations similar to those accomplished under war conditions.

Telephone Interview Question 11: Does your unit make an effort to sequence objectives and instruction in a manner which is felt to best promote student learning?

TABLE 4.11

Frequency Table for Telephone Interview Question 11

Response	Frequency	Relative Frequency
Often	19	63%
Sometimes	11	37%
Never	0	0%
Don't Know	0	0%

A discussion of Step 4, PLAN, DEVELOP, AND VALIDATE INSTRUCTION, began with this question. According to the responses listed in Table 4.11, all survey participants have made an effort to comply with this aspect of ISD theory. Two-thirds of the participants claimed to examine the sequencing of objectives on a regular basis when developing instruction. The remaining one-third who responded that sequencing was performed on a less frequent basis, also indicated that greater compliance with this aspect of ISD theory was preferred; however, constraints such as busy schedules, student failures and the corresponding remedial training, and regulations requiring all JPRs to be trained annually kept them from having the time to do so.

Telephone Interview Question 12: (Participants were asked to choose a statement which best described the use of self-pacing as opposed to lecture at the missile unit.)

TABLE 4.12

Frequency Table for Telephone Interview Question 12

Response	Frequency	Relative Frequency
Student self-pacing methods are used more than lecture	0	0%
Student self-pacing and lecture are used equally	15	50%
Lecture is used more than student self-pacing	15	50%
Don't Know	0	0%

As demonstrated in Table 4.12, none of the thirty participants claimed that student self-pacing was used more than lecture. A plausible explanation for this unanimous negative response was offered through the additional comments of two participants: one commented that SAC does not permit much self-paced training, since its regulations stipulate minimum time periods for monthly classroom sessions; the other participant hypothesized that the critical nature of an MCCM's job means that the unit cannot wait for, nor rely on, students who train at their own pace. Despite these two comments, self-pacing has been used at least to some extent at the units. Half of the participants replied that it was used on an equal basis with lecture. Comments from this group of participants indicated that the overall training program at the unit included self-paced complex packages and remedial training, in addition to monthly classroom lectures. The remaining participants apparently dwelled upon the monthly classroom sessions when they replied that lecture was more common than student self-pacing.

Telephone Interview Question 13: Please cite examples of methods in which student participation is encouraged within the training programs of your unit.

TABLE 4.13

Frequency Table for Telephone Interview Question 13

Response	Frequency	Relative Frequency
Guided Question/Answer Session during monthly classroom training	18	60%
Seminars (i.e. Transition training cross talks)	2	7%
Student critiques	2	7%
MPT Scripts	3	10%
Learning Center mock-ups	3	10%
EWO Message copying exercises	4	13%
Programmed texts	3	10%
Self-improvement programs	4	13%
Missile complex self-study packages	2	7%

Only one response was offered by a majority of the participants to this open-ended question. As indicated in Table 4.13, many of the missile units have attempted to reduce the lack of student motivation and learning generally associated with lectures by using guided question/answer sessions during monthly classroom training. The attempt has included presentation of

scenarios typical to those encountered by MCCMs at the launch facility, with instructors pausing at various points to ask students what their required actions would be in the situation.

The remaining responses listed in Table 4.13, though offered by a minority, are also valid examples of methods used to encourage student participation. Seminars, like guided question/answer sessions, encourage students to do more than sit and listen during classroom training. Programmed texts, self-improvement sessions, missile complex self-study packages, and student critiques encourage student participation through self-initiation or self-pacing. Finally, maximum student involvement occurs when MCCMs demonstrate competence by actually performing tasks, such as they do during MPT scripts, learning center mock-up scenarios, and EWO message copying exercises.

Telephone Interview Question 14: Does your unit evaluate the advantages and disadvantages of various media when developing instruction?

TABLE 4.14

Frequency Table for Telephone Interview Question 14

Response	Frequency	Relative Frequency
Often	10	33%
Sometimes	20	67%
Never	0	0%
Don't Know	0	0%

The Step 4 recommendation regarding media evaluation has not been followed on a frequent basis by missile unit instructors. Twenty respondents reported that media evaluation was accomplished only "Sometimes" (Table 4.14). Half of these twenty respondents provided additional clarifying remarks. Seven persons remarked that limitations such as consistently short deadlines for getting training programs developed and the lack of an extensive audio-visual capability at the unit kept media evaluations to a minimum. Three other respondents candidly replied that the medium selected for inclusion in training was that which was convenient or had been used before.

Telephone Interview Question 15: Does your unit perform a tryout on a small group of students in order to validate instruction?

TABLE 4.15

Frequency Table for Telephone Interview Question 15

Response	Frequency	Relative Frequency
Often	0	0%
Sometimes	15	50%
Never	15	50%
Don't Know	0	0%

Instruction has been validated at the missile unit through tryout on a small group of students only to a limited extent. As demonstrated in Table 4.15, there was an even distribution of responses in the "Sometimes" and "Never" categories, with comments such as "Seldom," "Not Practical," or "Time Doesn't Allow" added. Only two respondents offered examples to support their belief that small group tryouts occured at all: one reported that MPT scripts at his unit were validated through tryout on a crew of non-instructors; another described the recent tryout by students on a training program for new crew maintenance procedures.

Telephone Interview Question 16: Please cite any other method you would consider a means of validating instruction.

TABLE 4.16

Frequency Table for Telephone Interview Question 16

Response	Frequency	Relative Frequency
Tryout of instruction by other instructors	18	60%
Coordination process	13	43%
Analysis of test or evaluation results	6	20%
Student critique sheets or other student feedback	4	13%

The survey participants have indicated a variety of plausible validation methods as shown in Table 4.16. According to almost a majority of survey participants, technical accuracy has been validated through the coordination process which requires all training lesson plans to be reviewed by DOV and staff personnel. A greater number of participants indicated that instructor tryouts of training programs were also a validation method, because they ensured training programs ran as planned. Analysis of test or evaluation results and student feedback were offered as yet other methods of validation by a minority of participants, because these methods enabled instructors to ensure students could achieve training objectives.

Telephone Interview Question 17: How does your unit conduct internal evaluation on its training programs?

TABLE 4.17

Frequency Table for Telephone Interview Question 17

Response	Frequency	Relative Frequency
Analysis of Test Results	22	73%
DOV standardization checks on students	20	67%
Periodic formal review by instructors or staff	7	23%
Student feedback	4	13%
Coordination process	3	10%

This, the last of the open-ended questions on the Five-Step model, began the discussion of Step 5, CONDUCT AND EVALUATE INSTRUCTION. The similarity between internal evaluation and validation in the minds of missile unit instructors has been demonstrated by nearly identical responses for this question and the last, though the frequency of response differed between each question. Probably all responses were valid examples of internal evaluation, but analysis of test results and DOV standardization checks have obviously been relied upon to the greatest extent, as demonstrated in Table 4.17.

Telephone Interview Question 18: Which would you consider external evaluation?

TABLE 4.18

Frequency Table for Telephone Interview Question 18

Response	Frequency	Relative Frequency
Standardization/Training Conferences	16	53%
CPO Conferences	16	53%
EWO Conferences	12	40%
Higher Headquarters inspections	27	90%
Staff assistance visits	9	30%
Codes conferences	5	17%
Local exercises	7	23%
Comments from staff officers	3	10%
DOV checks on crews	3	10%

The first four response categories shown in Table 4.18 were presented as a check-list of items requiring a simple yes-no answer. Three out of the four categories were selected by a majority of respondents. There was nearly unanimous approval that Higher Headquarters Inspections from the SAC IG and 3901st SMES were external evaluation. Standardization/Training Conferences, designed as a forum for discussion of problems and potential improvements for missile unit training programs, and CPO conferences, convened for similar purposes regarding the CPOs, were selected by 16 out of 30 participants as sources of external evaluation. Though a majority of the overall participants did not select EWO conferences, six out of eight DO22T participants did, indicating that the persons for whom EWO conferences are designed consider it as a source of external evaluation.

Respondents offered five other plausible examples of external evaluation (listed as the last five response categories on Table 4.18). Though none of the examples were offered by more than 30 percent of the participants, five out of six DO9 participants included Codes Conferences in their responses. The inference based upon these responses is obviously identical to the one concerning DO22T participants and EWO conferences.

Mean Score Analysis for the Five-Step Model. As discussed in Chapter III, mean score analysis was used to summarize how often missile unit training complied with the recommendations

of ISD theory. This summary is provided in Table 4.19. Mean scores for Steps 1, 2, & 4 indicated less than frequent compliance with recommendations. By way of explanation, survey participants felt little need for accomplishment of Steps 1 & 2, because it was their common belief that HQ SAC had previously accomplished the steps for them. The CPOs and JPRs were the results of Steps 1 & 2, according to the participants. Constraints such as SAC regulations, the criticality of the work of MCCMs, deadlines, and the lack of audio-visual resources were felt to interfere with the procedures described in Step 4.

TABLE 4.19

Mean Score Analysis of the Five-Step Model

Step(s)	Mean Score	Corresponding To
1	1.00	Sometimes
2	1.17	Sometimes
3	1.94	Often
4	0.99	Sometimes
5	None Calculated	-
1-4	1.33	Sometimes

Unlike mean scores calculated for the other steps, those calculated for Step 3 indicated frequent compliance with its recommendations. The nearly unanimous response from the participants indicated that lesson plans, tests, and MPT scripts were based upon objectives "Often." As discussed previously,

there was even possibility that an "Always" category would have been chosen to a great extent.

Implications of this possibility are that both the mean score for Step 3 and the overall mean score are lower than if an "Always" category had been included. Thus, the overall mean score of 1.33 is perhaps slightly low. Though this score may not be totally valid, there is little possibility that a score based upon better response categories would increase beyond 1.5, because 270 responses were used in the overall mean calculation. A less than frequent compliance with the recommendations of the Five-Step Model is thus the overall inference based upon mean score analysis.

Criterion Referenced Instruction (CRI) Model

Telephone Interview Question 19: *Does your unit* perform goal analysis when developing training programs?

TABLE 4.20

Frequency Table for Telephone Interview Question 19

Response	Frequency	Relative Frequency
Often	2	7%
Sometimes	22	73%
Never	3	10%
Don't Know	3	10%

Seventy-three percent of survey participants responded that goal analysis, as prescribed by Dr. Robert F. Mager in the CRI model, was performed "Sometimes" (see Table 4.20). Of this 73 percent, five participants clarified their response with a "Seldom" comment. Another six persons in that group said that though goal analysis was performed, it was accomplished purely as common sense, not as the explicit analysis recommended by the model.

Telephone Interview Question 20: Does your unit present instruction in the manner recommended by Mager?

TABLE 4.21

Frequency Table for Telephone Interview Question 20

Response	Frequency	Relative Frequency
Often	8	27%
Sometimes	17	57%
Never	5	16%
Don't Know	0	0%

This question was preceded by a brief explanation of Dr. Mager's recommendation for conducting instruction. His recommendation involved: the presentation of objectives for the student to achieve; the identification of sources of information about the objectives; provisions for student practice in achieving the objectives; and criterion tests as a measure of

their achievement. Fifty-seven percent of the participants responded that instruction at their unit was presented in this manner at least "Sometimes," with another 27 percent saying it was performed "Often" (Table 4.21). Examples of unit training conducted in this manner were enrichment or remedial programs at two of the units, and missile complex study packages at another four.

Mean Score Analysis for the CRI Model. Application of the CRI Model, like the Five-Step Model, was limited. Mean scores for the unique aspects of the CRI Model hovered in the "Sometimes" range, as demonstrated in Table 4.22.

TABLE 4.22

Mean Score Analysis of the CRI Model

Category	Mean Score	Corresponding To
Goal Analysis	0.96	Sometimes
Mager Method	1.10	Sometimes
Overall Model	1.04	Sometimes

Mean Score Analysis for Both Models. The combined mean score for the two models was 1.28, no surprise based upon previous discussions.

Problems and Benefits of the CPOs

Telephone Interview Question 21: The CPOs provide a beneficial basis for training and evaluation.

TABLE 4.23

Frequency Table for Telephone Interview Question 21

Response	Frequency	Relative Frequency
Strongly Agree	9	30%
Agree	19	63%
Uncertain	1	3%
Disagree	1	3%
Strongly Disagree	0	0%

There was most definite agreement among survey participants that the CPOs were a useful instrument at the missile unit (refer to Table 4.23). Ninety-three percent of the survey participants showed their support for the above statement, although most were not willing to give it their strongest support.

Telephone Interview Question 22: Improved communication between DOV and the training divisions is one benefit of the CPOs.

TABLE 4.24

Frequency Table for Telephone Interview Questtion 22

Response	Frequency	Relative Frequency
Strongly Agree	7	23%
Agree	14	47%
Uncertain	7	23%
Disagree	1	3%
Strongly Disagree	1	3%

Once again, survey participants have shown agreement with a positive statement about the CPOs (Table 4.24). Their agreement, however, has been to a lesser extent than with the previous statement. Seventy percent of the participants responded either "Strongly Agree" or "Agree," though neither of the responses received a majority of the overall selection.

Telephone Interview Question 23: CPOs have accurate and appropriate time standards.

TABLE 4.25

Frequency Table for Telephone Interview Question 23

Response	Frequency	Relative Frequency
Strongly Agree	1	3%
Agree	15	50%
Uncertain	8	27%
Disagree	4	13%
Strongly Disagree	2	7%

Only a slight majority of the respondents (53 percent) have shown agreement with the above statement. This fact, plus the large number of "Uncertain" responses (eight), indicated some controversy over the accuracy of the CPOs. A typical comment provided by respondents, regardless of their responses shown in Table 4.25, was that some CPOs were accurate, and some not.

Telephone Interview Question 24: CPOs inhibit trainer/evaluator judgement on the MPT.

TABLE 4.26

Frequency Table for Telephone Interview Question 24

Response	Frequency	Relative Frequency
Strongly Agree	8	27%
Agree	11	37%
Uncertain	1	3%
Disagree	7	23%
Strongly Disagree	3	10%

Support for this negative statement about the CPOs has been indicated by survey participants. Individually, each of the "Strongly Agree" and "Agree" response categories shown in Table 4.26 were chosen by more participants than any other category. Combined totals for these two categories also outnumbered the remaining responses by a two-to-one margin. Participants from DOTI gave the greatest support to this statement; out of eight persons interviewed, four responded "Strongly Agree" and two "Agree." DO22 personnel gave slightly more reserved support for the validity of the statement; three out of the eight participants agreed, while another two strongly agreed. An additional point of interest about responses to this statement: while the statement was designed to examine a possible problem of

the CPOs, two participants commented that inhibition of trainer/evaluator judgement on the MPT was a benefit, because much subjectivity was taken out of their hands by the CPOs.

Telephone Interview Question 25: CPOs convey the wrong signal by emphasizing speed rather than correct action.

TABLE 4.27

Frequency Table for Telephone Interview Question 25

Response	Frequency	Relative Frequency
Strongly Agree	4	13%
Agree	6	20%
Uncertain	1	3%
Disagree	17	57%
Strongly Disagree	2	7%

A definite majority disagreed with this statement about a potential problem with the CPOs. The combined responses within the last two categories in Table 4.27 outnumbered the other categories 19 to 11, a two-to-one margin toward disagreement.

Telephone Interview Question 26: Are there any other benefits or problems with the CPOs that you would care to discuss?

TABLE 4.28

Frequency Table for Telephone Interview Question 26

Response	Frequency	Relative Frequency
Benefits		
Provides basic expectations for MCCMs	5	17%
Standardizes training & evaluation	4	13%
Problems		
Students learn only what they have to	5	17%
CPOs not validated prior to publishing or updated in a timely fashion	4	13%
CPOs inhibit training	3	10%
CPOs cause problems of interpretation	3	10%
Not enough flexibility and realism	2	7%
Don't allow all required actions to be evaluated	2	7%

There was no single response offered by a majority of the survey participants, indicating that the most common benefits/problems of the CPOs have been discussed prior to this open-ended question (refer to Table 4.28).

Problems and Benefits of ISD in General

Telephone Interview Question 27: Which statements reflect your opinion of the benefits of using ISD at the operational missile unit?

TABLE 4.29

Frequency Table for Telephone Interview Question 27

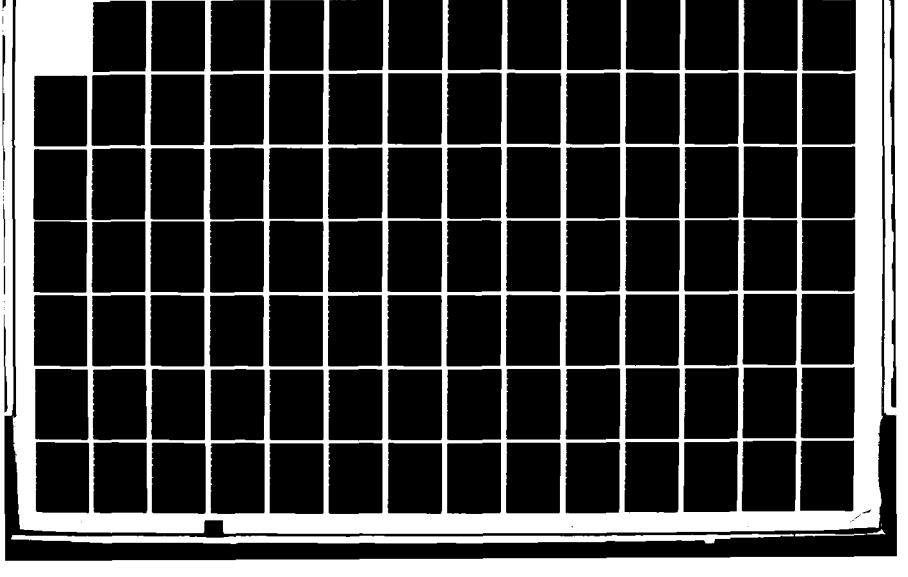
Response	Frequency	Relative Frequency
Student performance has increased	11	37%
Student learning rates have improved	14	47%
Student motivation has improved	7	23%
Total training time is reduced	12	40%
Costs are reduced	8	26%
ISD provides definite, yet flexible guidelines for developing and conducting instruction	26	87%
I don't see any benefits in using ISD at my unit	3	10%
Provides a command focus for training and evaluation	2	6%
Makes us look at entire training program (in other words there is a complete training loop)	2	6%

Only one item in Table 4.29 above was regarded by a majority of survey participants as a benefit of ISD at the missile unit. In fact, nearly all participants regarded ISD theory to be a useful outline for developing and conducting training. Many of the participants were reluctant to identify any other benefit because they had not been at the missile unit prior to the introduction of ISD, and thus had no basis for comparison with other training methods. Those participants who did identify

other benefits, however, often chose each of the first five response categories in Table 4.29. Thus, it is quite possible that all five of these categories are benefits, despite the lack of overwhelming support for them.

Telephone Interview Question 28: Which statements reflect your opinions of the problems caused by using ISD at the operational missile unit?

AD-A161 106 INSTRUCTURAL SYSTEM DEVELOPMENT AT OPERATIONAL MISSILE 2/3
UUNITS(U) AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH
SCHOOL OF SYSTEMS AND LOGISTICS G J FRITCHMAN SEP 85
UNCLASSIFIED AFIT/GLM/LSM/85S-24 F/G 5/9 NL



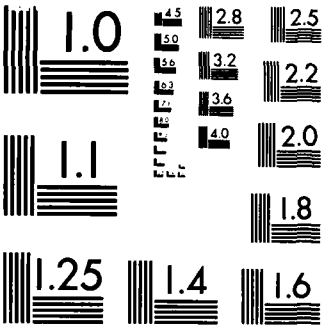


TABLE 4.30

Frequency Table for Telephone Interview Question 28

Response	Frequency	Relative Frequency
It is extremely time consuming to develop training using ISD	14	47%
Developing concise, understandable objectives is a difficult task for many persons	18	60%
Lack of cooperation or support between agencies hinders the process	21	70%
Constant turnover of military personnel results in instructors who lack training and experience in performing ISD tasks	28	93%
Higher Headquarters regulations and directives often interfere with the process	15	50%
The seemingly endless series of changes to the weapon system, regulations, and technical data hinders the ISD process. Much time and money is consumed re-doing tasks	16	53%
ISD-developed training programs lack sufficient theoretical information to enable long-term retention. (In other words, students can absorb material quickly, pass a test, then forget it quickly.)	19	63%
I don't see any problem using ISD at my unit	0	0%
Students don't care unless task is evaluatable and within CPOs	3	10%

Respondents identified more problems than benefits of using ISD at the missile unit. The first seven response categories in Table 4.30 were widely recognized as problems. While little additional information was provided by respondents about each of these problems, each has received a detailed explanation in Chapter II, during the discussion of problems at training (i.e. ATC) units.

Chapter Summary/Conclusions

Telephone Interview Question 29: I would appreciate any other comments regarding this survey, ISD in general, or any specific aspects of ISD.

TABLE 4.31

Frequency Table for Telephone Interview Question 29

Response	Frequency	Relative Frequency
ISD good in theory, not totally applicable at missile unit	8	27%

Thirteen participants summarized their thoughts on the application of ISD at the missile unit by responding to this survey item. A common theme developed by eight of them was that ISD provided interesting theory, but was not totally useful at the missile unit. According to these participants, missile units have not been permitted to follow all aspects of theory; factors such as regulations, HQ inspections, deadlines, and the critical

nature of the job of the MCCM limited extensive application. Therefore, ISD has been considered merely a tool by these eight participants - a tool modified as necessary to meet unit needs.

This chapter has analyzed the results of a survey on this ISD tool. Responses to twenty-nine questions or statements regarding:

- background characteristics of the participants,
- applications of the Five-Step and CRI Models, and
- problems and benefits of the CPOs and ISD in general

have been examined. Frequency tables were used to a great extent in this chapter, and mean scores to a lesser extent as a basis for analysis. This analysis will be used in the next chapter to develop a description of the ISD process as it relates to the operational missile unit.

V. CONCLUSIONS

Overview

This final chapter states the conclusions reached through this research effort. Three categories of conclusions are reported: a description of ISD as it relates to developing and conducting MCCM job trainiing; an identification of the implications surrounding the specific application of ISD at the missile unit; and a listing of recommendations for enhancement of the ISD process. Most conclusions, however, are reported within the first category, since the overall goal of this thesis is to provide such a description.

A Description of ISD at the Missile Unit

Two research questions, posed at the beginning of this thesis have served as the basis for describing ISD as it is related to developing and conducting MCCM job training:

1. Is any particular ISD model, combination of models, or component parts used at the missile unit?
2. What are the perceived problems/benefits of using ISD to develop and conduct job training?

Plausible answers to the research questions have been found by analyzing survey responses from a stratified sampling of 30 SAC missile unit instructor cadre. Answers to the research questions are provided below.

1. Is any particular ISD model, combination of models, or component parts used at the missile unit?

Analysis of survey responses demonstrates that two ISD models, the Five-Step Model and the CRI Model, are applied to a limited extent at the SAC missile unit. Though all specific procedures recommended within each model are applied, rarely are they applied more than sometimes. Instead, recommended procedures are often omitted or modified.

The first two steps of the Five-Step Model,

- ANALYZE SYSTEM REQUIREMENTS
- DEFINE EDUCATION AND TRAINING REQUIREMENTS

are most commonly omitted when developing MCCM job training. Most instructor cadre consider the JPRs and CPOs as products of Steps 1 and 2. As comprehensive listings of MCCM tasks and standards, the JPRs and CPOs usually preclude the need for instructors at the missile unit to accomplish task analysis or develop instructional standards prescribed by the model at these steps. Specific occasions for performance of these steps at the missile unit are relatively few. Generally, Step 1 task analysis is performed upon introduction of new systems or procedures affecting MCCMs, but not yet covered by JPRs or CPOs. The analysis performed by Minuteman units on new MCCM maintenance taskings is an example of Step 1 accomplishment. Very rare are occasions in which task analysis is performed on existing training programs; however, Titan units have performed such

analysis on the job of a Missile Combat Crew Commander, in an effort to improve transition training. After these rare occasions of Step 1 accomplishment, tasks selected for training are documented in local training regulations, Plans of Instruction, or supplemental lesson plans, in accordance with Step 2.

Recommendations of the Five-Step Model are more frequently and carefully applied at Step 3, DEVELOP OBJECTIVES AND TESTS, than any other step. Unlike the other steps, Step 3 is never omitted or modified. It is the beginning of the ISD process at the missile unit upon most occasions. Written objectives developed at this step specify:

- each behavior required of an MCCM,
- the conditions under which each behavior must be accomplished, and
- the standards for accomplishment.

Objectives are the basis for all lesson plans, tests, and MPT scripts. Criterion tests, also developed during this step, emphasize actual demonstration of an MCCM's achievement of objectives. Many examples of such criterion tests exist at the units, according to instructor cadre: MPT scripts, remedial or individual improvement tests, learning center scenarios, EWO tape testing, quarterly EWO tests, and demonstrations of competence on on-site equipment. By requiring MCCMs to physically demonstrate

their competence, all of these criterion tests correspond closely to the recommendations provided within Step 3 of the model.

The specific recommendations provided within Step 4, PLAN, DEVELOP, AND VALIDATE INSTRUCTION, lack widespread application at the missile unit, with one exception. Instructors often attempt to sequence objectives and instruction in a manner which they feel best promotes student learning, as recommended by the model. Unlike model recommendations, however, there is less than frequent evaluation of the potential media to be used for training. Constraints, such as short deadlines or the lack of audio-visual capability, often hinder media evaluations, leaving instructors to choose the most convenient medium or the one which had been used before.

Self-paced methods of instruction are not used as much as recommended by the model at Step 4 either. At the missile unit, self-pacing is no more common than lecture, possibly even less common. There are relatively few programmed texts at the missile units, and the only self-paced program common to all missile units is the monthly study package available at each of the missile complexes. The critical nature of the work of MCCMs hinders great reliance upon self-pacing, as well as SAC training regulations which specify minimum training periods for all MCCMs. Though their reliance upon self-pacing is less than recommended at Step 4, missile unit instructors recognize the importance of student involvement promoted by such training. Instructors

therefore substitute a variety of other training techniques and methods in an effort to promote student involvement. Examples of such techniques and methods include: seminars, student critiques, MPT scripts, learning center scenarios, EWO message copying exercises, self-improvement programs, and guided question/answer sessions during lectures.

The recommendations of Step 4 regarding validation of training programs are also modified. Seldom is instruction validated through tryouts on small groups of students prior to the starting date of the program. Instead, instructors rely upon the formal coordination process within the missile unit and upon tryouts by other instructors to ensure training material is accurate. Students are generally brought into the validation process after formal training has started. Evidence of their ability to meet the objectives of the training program is found in their test and evaluation results. Their critiques also provide feedback about the worthiness of training developed at this step.

By the time student validation is included, missile unit programs have moved into Step 5 of the model, CONDUCT AND EVALUATE TRAINING. Missile unit instructors consider student validation to be identical to the internal evaluation recommended by this last step. Thus, a large portion of validation and internal evaluation are performed concurrently. Missile unit instructors also rely upon periodic formal review by

staff members within the Operations Deputate for further internal evaluation.

External evaluation of training programs at Step 5 is generally considered to occur through interaction with agencies outside the missile unit. Inspections from agencies such as the SAC IG and the 3901st SMES are important determinants of the ability of a particular missile unit to train MCCMs to accomplish tasks under conditions and standards listed in the CPOs. These inspections also examine the appropriateness of particular CPOs, thus providing important feedback to HQ SAC regarding possible revisions. Similar feedback is provided through periodic conferences involving all missile units. Examples of such conferences convened under the sponsorship of HQ SAC include: Standardization/Training conferences, CPO conferences, EWO conferences, and Codes conferences. By providing feedback for possible revisions, these conferences and inspections link the final step of the Five-Step Model to its first step.

The Five-Step Model, as applied at the operational missile unit, is characterized by heavy SAC involvement at the beginning and the end. This involvement drastically reduces the need for application of Steps 1 and 2 by missile unit instructors, but keeps them participating at Step 5. In between these steps, there is widespread application of the recommendations by the model at Step 3, and modified application of the recommendations at Step 4.

Application of the CRI Model is no more extensive than that of the Five-Step Model, since both offer similar recommendations about developing and conducting training programs. Even the unique contributions of CRI to ISD theory find less than frequent use at the missile unit. There is lack of explicit goal analysis performed at the unit, for instance. On the rare occasions goal analysis is performed for training purposes, it is generally an undocumented, common sense process. Instructors find somewhat greater use for the model's recommendation of a specific method for conducting instruction (involving the presentation of objectives for the student to achieve, the identification of sources of information about the objectives, provisions for student practice in achieving the objectives, and criterion tests as measure of their achievement). Use of this method is no greater than sometimes, however.

2. What are the perceived problems/benefits of using ISD to develop and conduct job training? Instructor cadre identify a number of benefits and problems regarding the general application of ISD at the missile unit. There is overwhelming recognition by instructor cadre that one benefit of ISD is its definite, yet flexible guidelines for developing and conducting instruction. Comments offered by missile unit cadre indicate that ISD models are regarded as theoretical tools which can be modified to meet the specific needs of the unit. Many instructor cadre also recognize other benefits:

- improvements in student motivation, learning rates, and performance, and
- reductions in total training time and costs.

The problems regarding the general application of ISD at the missile unit are more numerous. Seven specific problems are recognized by instructor cadre:

- constant turnover of military personnel, resulting in instructors who lack training and experience in performing ISD tasks
- lack of cooperation or support between agencies which hinders the process
- a lack of sufficient theoretical information to enable long term retention by students
- higher headquarters regulations which contradict recommendations of ISD models
- the difficulty of developing concise, understandable objectives
- the time-consuming nature of developing training using ISD
- the large consumption of time and money re-doing ISD tasks due to the seemingly endless series of changes to the weapon system, regulations, and technical data.

The benefits and problems of ISD as perceived by instructor cadre at the operational missile unit are thus identical to those encountered by training unit (i.e. ATC) instructors.

Missile unit instructor cadre also have definite opinions about the problems/benefits of the primary ISD-related product at the missile unit - the CPOs. Two benefits of the CPOs are recognized. The greater benefit, based upon the percentage of instructor cadre who indicated agreement during the survey, is the ability of the CPOs to provide a solid foundation for training at the missile unit. The other benefit is an improvement in communication between DOV and the training divisions, probably because the foundation laid by the CPOs applies to both types of agencies. These conclusions regarding the benefits of the CPOs confirm findings by Major Luethemeier in the Air Command and Staff College research report cited in Chapter II.

The findings of Major Leuthemeier, however, differ somewhat with the conclusions of this thesis regarding the problems of the CPOs. Two aspects of the CPOs said to be problems by Major Leuthemeier are not currently considered problems by the majority of instructor cadre at the missile units. The idea that CPOs convey a wrong signal by emphasizing speed rather than correct action is rejected by two-thirds of the instructor cadre. A slight majority of instructor cadre also reject the notion that CPO time standards are less than accurate. In their minds, the lone problem is the inhibiting nature of the CPOs with respect to trainer/evaluator judgement on the MPT.

Implications

The conclusions regarding ISD models and their problems/ benefits yield a reasonably comprehensive and valid description about the ISD process as applied at the operational missile unit. There are limitations to the absolute certainty of these conclusions, however. The research design reduces certainty to some extent, as discussed in Chapter III. Better structured response categories to survey questions on the Five-Step and CRI Models would provide a more conclusive quantitative backup for inferences drawn through logic. A census of missile unit instructors rather than a small stratified sampling of instructor cadre also would promote greater certainty. The cadre surveyed by this research effort generally have more than two years of experience developing and conducting instruction at the missile unit, and have accomplished the following ISD-related training: locally-developed unit training, the SAC Missile Instructor Course, and either the Criterion Referenced Instruction Training Course or the Wing Instructional Systems Manager Training Course. It is likely that cadre surveyed for this research effort have more experience and educational background developing and conducting missile unit training than the remainder of the instructor population. While this experience and education puts the cadre in a position to be knowledgeable of the ISD process at the missile unit, there is a slight possibility that their ideas are not representative of the instructor population.

If, however, conclusions based on the ideas of cadre are representative of the instructor population, then there are a number of implications for the missile units regarding application of ISD in the manner previously described. Positive and negative implications can be identified.

The omission or modification of ISD steps should not automatically imply negative connotations about application of ISD within the missile unit. ISD models are supposed to be flexible in order to accommodate particular training needs. In addition, formal guidelines for developing training programs using ISD are listed in Air Force manuals and pamphlets, thus are not regulatory. Unfortunately, however, a few desirable effects on training programs are lost when missile unit instructors modify certain aspects of the models.

When missile units modify the validation process to include formal coordination and instructor tryouts instead of student tryouts, they do not ensure that actual students can achieve the objectives of training prior to implementation of the training program. Instructors therefore begin a training program with less knowledge of the certainty of its success than they could obtain. While analysis of test or evaluation results later obtains feedback on the success of the training program, it is performed after training has been initiated, when consequences of inadequate training are more serious for both instructors and

students. The lack of student tryouts is therefore an unfortunate circumstance.

Other negative implications regarding the application of ISD at the missile unit are the lack of evaluation by instructors of the media to be used for training, and the relative lack of student self-pacing. By failing to comply more carefully with the recommendations of the Five-Step Model regarding media evaluation and student self-pacing, missile unit instructors potentially lose an element of student involvement during training sessions. Students are often less motivated to learn when they are instructed through media and training methods which are not appealing to them.

Each of these negative implications result from constraints within the missile unit environment. Constraints have been previously identified in this chapter: the lack of audio-visual capability which prohibits the use of potentially effective media; the missile unit training regulations published by SAC which specify minimum training periods for classroom training and thus hinder student self-pacing; and huge number of deadlines which hinder accomplishment of those training tasks that are not absolutely necessary. The five problems detailed under Research Question Two in this chapter also contribute to the negative implications listed above. Additionally, the fact that instructor cadre identify more problems than benefits regarding ISD application is itself a negative implication.

On the positive side, the primary product of ISD at the missile unit, the CPOs, is considered to be a beneficial basis for training and evaluation by 93 percent of missile unit instructor cadre. An overwhelming majority of the same cadre regard the Five-Step and CRI Models as useful tools. The obvious implication from these two positive notes is that ISD will not be abandoned, regardless of the constraints or problems posed to the missile unit.

Recommendations

Though not within the purview of the original research goal, recommendations may enhance future application of ISD at the missile units. The basic recommendation for enhancing the application of ISD is to remove as many of the constraints and problems identified in this research report as possible. Additional funding might be allotted for purchase of audio-visual equipment. Personnel allocations for the training divisions could be increased in an effort to remove time constraints from individuals. Requirements for minimum classroom training periods could be removed from regulations. These are but three simple examples of actions which may eliminate constraints. Headquarters SAC would have to be the focal point for removal of constraints due to the nature of these actions. More complicated actions might be necessary in order to remove many of the other problems associated with the general application of ISD. Because

many of the problems identified in this research report have been encountered in training units, consultation with ATC might offer additional solutions. Of course, any recommended solutions for removal of constraints or problems must be considered in conjunction with their effect on MCCM proficiency. Costs of enhancing ISD application at the missile unit may be too large unless they are accompanied by improvement in MCCM proficiency.

Another recommendation for enhancing ISD application at the missile unit is to continue descriptive research on the topic. This research report could be expanded to identify specific differences in ISD application between training divisions or weapon systems at the SAC missile units. Such expanded research would promote greater understanding by instructors about the development of training programs within their division and weapon system. In order to statistically ascertain differences between divisions or weapon systems, the research would have to be based upon a census of the instructor population, or at least a larger, scientifically drawn sample than the one used in this thesis. The increase in certainty promoted by a large sample or census would also be an advantage over the certainty limitations within this thesis. Design of any future research efforts should also seek improvement on other limitations previously described.

Final Summary

The recommendations most recently identified above, like the positive and negative implications previously described during the chapter, have provided useful supplemental information to this research effort. The overall goal of the research effort, however, has been to provide a detailed description of ISD as it relates to the operational missile unit. Explanations of the ISD models applied at the missile unit and their problems/benefits have been used to fulfill this goal. These explanations have been carefully synthesized based upon a background literature review, interviews, and a comprehensive survey of missile unit instructor cadre. Ultimately, it is hoped that these explanations have provided practical literature for instructors and staff officers at the missile unit, enabling them to understand, apply, and control ISD in the development of MCCM job training with greater confidence and efficiency.

Appendix A: Formal Courses on Developing and Conducting Training

SAC Missile Instructor Course

A three-day course offered by a field team at the missile unit "to provide missile operations instructors the knowledge, skills, and interaction necessary to provide the best possible instruction for the SAC missile operations force." Divided into 12 subjects: "self-paced instruction, elements of the professional instructor, laws of learning, defense mechanisms, critiquing, instructional systems development (ISD), lesson plan construction, training aids, speaking techniques, MPT lab, stress management, and lesson plan presentation."

Criterion Referenced Instruction Training Course

"Provides training in the preparation of criterion referenced instruction to support instructional systems development concepts. Training includes analyzing the principles of criterion referenced instruction; writing performance objectives; accomplishing task/goals performance analysis; preparing criterion tests; identifying relevant course materials; designing course control documents; and applying performance management principles for supervisors, instructors, and students. This course is primarily intended for developers of instruction." Course duration: three weeks, self-paced.

Mini-CRIT Course

"A combination of Mager/Pipe Criterion Referenced Instruction (CRI) and AF Instructional Systems Development (ISD) methods of developing and evaluating instructional programs. Provides training for individuals involved in managing and supervising the preparation, development, implementation, and evaluation of missile training programs at all levels of command. Includes instruction in analyzing tasks, determining education and training requirements, developing objectives and tests, and analyzing goals. Compares conventional or traditional training to the CRI and ISD approach to developing instruction." Approximately one week duration, self-paced.

Wing Instructional Systems Manager Training Course

"Provides training in the basic concepts and applications of learning, teaching, and evaluating. Includes study of selected portions of Instructional Systems Development (ISD) and Criterion Referenced Instruction (CRI) concepts which are used in determination and evaluation of course objectives. In practice training sessions, the students will demonstrate comprehension of these concepts and applications by presenting lessons which they have developed during course. Also includes training in the use of visual aids such as sound-slide and videotape as well as techniques useful in wing instructional systems management." Course duration: approximately four weeks, self-paced. For persons assigned to ISMD. (1:vi-viii; and 3; 4; and 5)

Appendix B: Instructional System Development Survey Interview Schedule

Consent

Good morning (afternoon). This is Captain Guy Fritchman at Wright-Patterson AFB. I'm a former EWO instructor and Wing Instructional System Manager at McConnell AFB. Currently I'm studying for my Master's degree at AFIT. As part of my studies, I'm conducting interviews to gather information on ISD as it applies to operational missile units. I'm trying to interview one person from each training division at each unit. Ultimately, I hope this research will provide a practical description for new instructors and staff members about ISD as it applies to the missile unit.

- (When talking to Chief, ISMD) Would you be willing to participate?
- (When talking to other persons) (Name of Chief, ISMD at that unit) said you would be a good person to interview. Would you be willing to participate?

Appointment

The interview will take approximately 40-50 minutes of your time. Would now be a good time, or can I make an appointment to call you back later?

(If interview done by appointment, call back at scheduled time and reintroduce myself and the purpose of the interview, then continue with this interview schedule.)

Survey Introduction

Structure. The interview I'm about to conduct has five basic parts. Part I requests general background information from you. A Five-Step ISD Model is described in Part II while soliciting your experience, knowledge, and opinions of this model. Similar information is solicited in Part III about a model by Dr Robert F. Mager. Your opinion of the problems and benefits of the Comprehensive Performance Objectives is sought in Part IV. Finally, Part V examines your opinion of ISD in general.

Additional Items. A few other brief items I want you to be aware of before we get started:

- This survey is being accomplished primarily for research purposes, to fulfill the requirements for my degree at AFIT. It is not commissioned by HQ SAC, although it has been coordinated through DOMM (Major Maggio).
- Your name will not be used when the results of this survey are written.

- And finally, many of the questions I'm about to ask are structured and require you to choose from the answers I'll provide. Feel free, however, to provide any additional comments you desire.

That concludes my introduction. Do you have any questions or comments before we get started?

Part I: Background Information

1. How much experience have you had developing or conducting instruction at the missile unit?

   a. less than 6 months
   b. at least 6 months but less than 1 year
   c. at least 1 year but less than 1 1/2 years
   d. at least 1 1/2 years but less than 2 years
   e. 2 years or more

2. What instructor training have you accomplished?

   a. Locally developed unit training
   b. SAC Missile Instructor course
   c. Criterion Referenced Instruction Training (CRIT) course
   d. Mini-CRIT course
   e. Wing Instructional Systems Manager Training course
   f. Academic Instructor School
   g. Other:_____

Part II: Five-Step ISD Model

One model accepted within SAC is a five-step process as prescribed by AFM 50-2. To develop a common basis for discussing the use of this model within your unit, I would like to briefly describe my understanding of each step, pausing between each description to ask you a few questions.

Step 1 of the model recommends that instructors begin the process of developing a job training program with "task analysis." Here instructors should survey, question, or observe workers, and analyze regulations, checklists, and technical data about the job in order to determine its human performance requirements. Through such analysis, the instructor compiles a list of the knowledge, skills, behaviors, duties, and tasks required by workers to perform their jobs in a satisfactory manner.

3. Does your unit accomplish task analysis similar to Step 1 in order to produce a list of the knowledge, skills, behaviors, duties, and tasks required of missile combat crew members?

a. Often

b. Sometimes

c. Never

d. Don't Know

4. Are you aware of any product within your unit or SAC which can be regarded as the result of Step 1? If so please specify?

The goal of Step 2 of this model is to determine the exact instruction needed to qualify workers to do the job. This determination is based upon the analysis in Step 1 and upon considerations such as: tasks which potential students cannot already accomplish; consequence of inadequate performance; how fast the person must react to status change; frequency of performance; availability of instructors, equipment, and facilities; long lead time resources; and time for training. The tasks, knowledges, and proficiencies identified for training are compiled into instructional standards, a specialized publication used to standardize and control training.

5. Does your unit accomplish the tasks listed in Step 2 in order to produce a set of instructional standards?

a. Often

b. Sometimes

c. Never

d. Don't Know

6. Are you aware of any product within your unit or SAC which can be regarded the result of Step 2? If so, please specify.

At Step 3, instructors develop objectives for each of the instructional standards of the previous step. Objectives are specific statements labeling each behavior required of a student, the conditions under which each behavior must be accomplished, and the level of excellence or standards for accomplishment. Criterion tests, also developed during this step, serve as the basis for measuring the students' performance, as specified by the objectives.

7. Does your unit use written objectives as the basis for training?

a. Often

b. Sometimes

c. Never

d. Don't Know

8. Written tests at your unit are based upon specific objectives.

a. Often

b. Sometimes

c. Never

d. Don't Know

9. MPT scripts produced by your unit are based upon specific objectives.

a. Often

b. Sometimes

c. Never

d. Don't Know

10. Please cite examples of criterion tests used by your unit which require actual demonstration of the student's performance.

During the fourth step of this model, the instructor plans, develops, and validates the actual instruction which will be presented to the student. The model recommends that instructors sequence objectives in a manner which produces required learning in the shortest time. It also encourages instructors to select methods of instruction whereby students can participate or individually pace themselves toward achieving objectives. Furthermore, careful selection of media is encouraged, so that information about the objective is provided in a manner interesting to the student, but at the same time does not become a burden on the instructional system. By media, I am referring to instructors, textbooks, programmed texts, simulators, slides, videotapes, etc. Other final courseware, such as

lesson plans, study guides, and Plans of Instruction are produced at Step 4. When final courseware has been developed, validation of the training program is recommended, using a small sample of students to determine if they can achieve the objectives through the planned instruction.

11. Does your unit make an effort to sequence objectives and instruction in a manner which is felt to best promote student learning?

a. Often

b. Sometimes

c. Never

d. Don't Know

12. At your unit:

a. Student self-pacing methods are used more than lecture

b. Student self-pacing and lecture are used equally

c. Lecture is used more than student self-pacing

d. Don't Know

13. Please cite examples of methods in which student participation is encouraged within the training programs of your unit.

14. Does your unit evaluate the advantages and disadvantages of various media when developing instruction?

a. Often

b. Sometimes

c. Never

d. Don't Know

15. Does your unit perform a tryout on a small group of students in order to validate instruction?

a. Often

b. Sometimes

c. Never

d. Don't Know

16. Please cite any other method you would consider as a means of validating instruction.

The fifth step of the model involves conduct of training (in accordance with the plan developed in Step 4) and evaluation of its adequacy. There are two types of evaluation: internal and external. Internal evaluation is similar to validation -- it allows the evaluator to judge whether the training system still enables the student to achieve the objectives. External evaluation examines whether the tasks required of the job for which the training system exists are

still the same as when the original task analysis was performed.

17. How does your unit conduct internal evaluation on its training programs?

18. Which of the following would you consider external evaluation? (More than one response may be appropriate)

a. Standardization/Training Conferences

b. CPO conferences

c. EWO conferences

d. Higher Headquarters evaluations

e. Other: _____

Part III: Criterion Referenced Instruction Model

Another model accepted by SAC is one developed by Dr. Robert F. Mager. It is similar to the Five-Step Model; however, it provides additional contributions to developing training programs. One contribution is goal analysis. Unlike task analysis, goal analysis identifies cognitive areas of potential training such as attitudes rather than tasks or skills required by persons. It could be desired, for example, that individuals show pride, finesse, or enthusiasm in their work. It is the task of the instructor to identify such goals, then determine specific student

performances which, if accomplished, indicate achievement of the goals.

19. Does your unit perform goal analysis when developing training programs?

a. Often

b. Sometimes

c. Never

d. Don't Know

Mager furthermore recommends that most instruction be presented in the following manner: first, students are given a set of objectives to achieve. Necessary information about each specific objective is presented in the form of explanations, examples, or pictures. Other sources of information are usually also identified to students. Next, the students are given practice in achieving each objective, and they are questioned about each objective as they practice, enabling each of them to self-measure progress. Correct answers indicate that a particular student is capable of achieving the objective. On the other hand, incorrect answers necessitate additional information and practice, which should be provided. Finally, as students complete practice at their own pace, each is presented with a criterion test as a final measure of ability in achieving the objective.

20. Does your unit present instruction in the manner recommended by Mager?

a. Often

b. Sometimes

c. Never

d. Don't Know

Part IV: Comprehensive Performance Objectives (CPOs)

For this part of the interview, I seek your opinion on various aspects of the CPOs. Here I wish to know the strength of your opinion; therefore, I ask that you respond with one of the following answers for each question:

Strongly agree

Agree

Uncertain

Disagree

Strongly disagree

I'll repeat these possible choices after each question.

21. The CPOs provide a beneficial basis for training and evaluation.

a. Strongly Agree

b. Agree

c. Uncertain

d. Disagree

e. Strongly Disagree

22. Improved communication between DOV and the training divisions is one benefit of the CPOs.

a. Strongly Agree

b. Agree

c. Uncertain

d. Disagree

e. Strongly Disagree

23. CPOs have accurate and appropriate time standards.

a. Strongly Agree

b. Agree

c. Uncertain

d. Disagree

e. Strongly Disagree

24. CPOs inhibit trainer/evaluator judgement on the MPT.

a. Strongly Agree

b. Agree

c. Uncertain

d. Disagree

e. Strongly Disagree

25. CPOs convey the wrong signal by emphasizing speed rather than correct action.

a. Strongly Agree

b. Agree

c. Uncertain

d. Disagree

e. Strongly Disagree

26. Are there any other benefits or problems with the CPOs that you would care to discuss?

Part V: General Opinion of ISD

In this final part of the interview, I will read to you a series of statements reflecting benefits and problems said to be caused by using ISD at training units (i.e ATC units). Please indicate after each statement whether you believe it to be applicable at the operational missile unit. A simple yes/no answer will suffice, unless you have additional comments.

27. Which of the following statements reflect your opinion of the benefits of using ISD at the operational missile unit.

a. Student performance has increased.

b. Student learning rates have improved.

c. Student motivation has improved.

d. Total training time is reduced.

e. Costs are reduced.

f. ISD provides definite, yet flexible guidelines for developing and conducting instruction.

g. I don't see any benefits in using ISD at my unit.

h. Other _____

28. Which of the following reflect your opinion of the problems caused by using ISD at the operational missile unit?

a. It is extremely time-consuming to develop training using ISD.

b. Developing concise, understandable objectives is a difficult task.

c. Lack of cooperation or support between agencies hinders the process.

d. Constant turnover of military personnel results in instructors who lack training and experience in performing ISD tasks.

e. Higher Headquarters regulations and directives often interfere with the process.

f. The seemingly endless series of changes to the weapon system, regulations, and technical data hinders the ISD process. Much time and money is consumed re-doing tasks.

g. ISD-developed training programs lack sufficient theoretical information to enable long-term retention (in other words, students can absorb material quickly, pass a test, then forget it quickly).

h. I don't see any problems using ISD at my unit.

i. Other _____

29. This concludes the structured part of my survey; however, I would appreciate any other comments regarding this survey, ISD in general, or any specific aspects of ISD.

(When interviewing Chief, ISMD, ask for names of potential participants from DOTI, DO22, and DO9.)

Thank you for participating. Your information has been very helpful. I wish you best of luck.

Appendix C: Instructional System Development (ISD) Questionnaire

INTRODUCTION: ISD models provide flexible guidelines for developing, conducting, and evaluating instruction. Though some ISD models provide a step-by-step procedure, application of the steps and tasks within the steps will differ depending upon the situation. The application of ISD at your missile unit, for example, is probably different than at training units within the Air Training Command. This survey is used to gather data on ISD as it applies to the operational missile unit. Results of the survey will be compiled into the research report of a former missile weapon system and EWO instructor now at the Air Force Institute of Technology. Ultimately it is hoped that the research report will provide a practical description for new instructors and staff members about ISD as it applies to the missile unit.

SURVEY STRUCTURE: This survey has five basic parts. Part I requests general background information from you. A Five-Step ISD Model is described in Part II while soliciting your experience, knowledge, and opinions of this model. Similar information is solicited in Part III about a Criterion-Referenced Instruction Model. Your opinion of the benefits and problems of the Comprehensive Performance Objectives is sought in Part IV. Finally, Part V examines your opinion of ISD in general.

DIRECTIONS FOR COMPLETING THIS SURVEY: Many questions in this survey provide a list of possible answers. For these questions, please circle the answer which best indicates your opinion or choice. Unless specified in the question, please circle only one answer. Other questions are open-ended questions; please provide comments as appropriate to these questions in the space provided. You are welcome to provide additional comments at the end of this survey or beside any question.

Part I: General Information

1. To which unit are you assigned?

   a. 44 SMW

   b. 90 SMW

   c. 91 SMW

   d. 308 SMW

   e. 321 SMW

   f. 341 SMW

   g. 351 SMW

   h. 381 SMW

2. To which division are you assigned?

   a. DOTI

   b. DO22

   c. DO9

   d. DO5

3. How much experience have you had developing, conducting, or evaluating instruction at the missile unit?

a. Less than 6 months

b. At least 6 months but less than 1 year

c. At least 1 year but less than 1 1/2 years

d. At least 1 1/2 years but less than 2 years

e. 2 years or more

4. What instructor training have you accomplished? (Circle all applicable choices.)

a. Locally developed unit training

b. SAC Missile Instructor Course

c. Criterion Referenced Instruction Training (CRIT) Course

d. Mini-CRIT Course

e. Wing Instructional Systems Manager Training Course

f. Academic Instructor School

g. Other: _____

_____

_____

Part II: Five-Step ISD Model

One ISD model accepted within SAC is a five-step process. Step 1 of the model recommends that instructors begin the process of developing a job training program with "task analysis." Here instructors should survey, question, or observe workers, and

analyze regulations, checklists, and technical data about the job in order to determine its human performance requirements. Through such analysis, the instructor compiles a list of knowledge, skills, behaviors, duties, and tasks required by workers to perform their jobs in a satisfactory manner.

5. Does your unit accomplish task analyses similar to Step 1 in order to produce a list of knowledge, skills, behaviors, duties, and tasks required of missile combat crew members?

a. Often

b. Sometimes

c. Never

d. Don't Know

6. Are you aware of any product within your unit or SAC which can be regarded as the result of Step 1? If so, please specify.

_____

_____

_____

The goal of Step 2 of this model is to determine the exact instruction needed to qualify workers to do the job. This determination is based upon the analysis in Step 1 and upon considerations such as: tasks which potential students cannot already accomplish; consequence of inadequate performance; how fast the person must react to status change; frequency of performance; availability of instructors, equipment, and

facilities; long lead time resources; and time for training. The tasks, knowledges, and proficiencies identified for training are compiled into instructional standards, a specialized publication used to standardize and control training.

7. Does your unit accomplish the tasks listed in Step 2 in order to produce a set of instructional standards?

a. Often

b. Sometimes

c. Never

d. Don't Know

8. Are you aware of any product within your unit or SAC which can be regarded the result of Step 2? If so, please specify.

_____

_____

_____

At Step 3, instructors develop objectives for each of the instructional standards of the previous step. Objectives are specific statements labeling each behavior required of a student, the conditions under which each behavior must be accomplished, and the level of excellence or standards for accomplishment. Criterion tests, also developed during this step, serve as the basis for measuring the student's performance, as specified by the objectives.

9. Does your unit use written objectives as the basis for training?

a. Often

b. Sometimes

c. Never

d. Don't Know

10. Written tests at your unit are based upon specific objectives.

a. Often

b. Sometimes

c. Never

d. Don't Know

11. MPT scripts produced by your unit are based upon specific objectives.

a. Often

b. Sometimes

c. Never

d. Don't Know

12. Please cite examples of criterion tests used by your unit which require actual demonstration of the student's performance.

_____

_____

_____

During the fourth step of this model, the instructor plans, develops, and validates the actual instruction which will be presented to the student. The model recommends that instructors sequence objectives in a manner which produces required learning in the shortest time. It also encourages instructors to select methods of instruction whereby students can participate or individually pace themselves toward achieving objectives. Furthermore, careful selection of media (instructor, textbook, programmed text, simulator, slides, videotape, etc.) is encouraged, so that information about the objective is provided in a manner interesting to the student, but at the same time does not become a burden on the instructional system. Other final courseware, such as lesson plans, study guides, and Plans of Instruction are produced at Step 4. When final courseware has been developed, validation of the training program is recommended, using a small sample of students to determine if they can achieve the objectives through the planned instruction.

13. Does your unit make an effort to sequence objectives and instruction in a manner which is felt to best promote student learning?

a. Often

b. Sometimes

c. Never

d. Don't Know

14. At your unit:

a. Student self-pacing methods are used more than lecture.

b. Student self-pacing and lecture are used equally.

c. Lecture is used more than student self-pacing.

d. Don't Know

15. Please cite examples of methods in which student participation is encouraged within the training programs of your unit.

_____

_____

_____

16. Does your unit evaluate the advantages and disadvantages of various media when developing instruction?

a. Often

b. Sometimes

c. Never

d. Don't Know

17. Does your unit perform a tryout on a small group of students in order to validate instruction?

a. Often

b. Sometimes

c. Never

d. Don't Know

18. Please cite any other method you would consider as a means of validating instruction.

_____

_____

_____

The fifth step of the model involves conduct of training (in accordance with the plan developed in Step 4) and evaluation of its adequacy. There are two types of evaluation: internal and external. Internal evaluation is similar to validation - it allows the evaluator to judge whether the training system still enables the student to achieve the objectives. External evaluation examines whether the tasks required of the job for which the training system exists are still the same as when the original task analysis was performed.

19. How does your unit conduct internal evaluation on its training programs?

_____

_____

_____

20. Please circle those functions which you would consider external evaluation (more than one may be appropriate).

a. Standardization/Training Conferences

b. CPO Conferences

c. EWO Conferences

d. Higher Headquarters Evaluations

e. Other: _____

_____

_____

Part III: Criterion Referenced Instruction Model

Another model accepted by SAC is one developed by Dr. Robert F. Mager. It is similar to the Five-Step Model; however, it provides additional contributions to developing training programs. One contribution is goal analysis. Unlike task analysis, goal analysis identifies cognitive areas of potential training, such as attitudes rather than tasks or skills required by persons. It could be desired, for example, that individuals show pride, finesse, or enthusiasm in their work. It is the task of the instructor to identify such goals, then determine specific student performances which, if accomplished, indicate achievement of the goals.

21. Does your unit perform goal analysis when developing training programs?

a. Often

b. Sometimes

c. Never

d. Don't Know

Mager furthermore recommends that most instruction be presented in the following manner: first, students are given a set of objectives to achieve. Necessary information about each specific objective is presented in the form of explanations, examples, or pictures. Other sources of information are usually also identified to students. Next, the students are given practice in achieving each objective, and they are questioned about each objective as they practice, enabling each of them to self-measure progress. Correct answers indicate that a particular student is capable of achieving the objective. On the other hand, incorrect answers necessitate additional information and practice, which should be provided. Finally, as students complete practice at their own pace, each is presented with a criterion test as a final measure of ability in achieving the objective.

22. Does your unit present instruction in the manner recommended by Mager?

a. Often

b. Sometimes

c. Never

d. Don't Know

Part IV: Your Opinion of the Comprehensive Performance Objectives (CPOs)

23. The CPOs provide a beneficial basis for training and evaluation.

a. Strongly Agree

b. Agree

c. Uncertain

d. Disagree

e. Strongly Disagree

24. Improved communication between DOV and the training divisions is one benefit of the CPOs.

a. Strongly Agree

b. Agree

c. Uncertain

d. Disagree

e. Strongly Disagree

25. CPOs have accurate and appropriate time standards.

a. Strongly Agree

b. Agree

c. Uncertain

d. Disagree

e. Strongly Disagree

26. CPOs inhibit trainer/evaluator judgement on the MPT.

a. Strongly Agree

b. Agree

c. Uncertain

d. Disagree

e. Strongly Disagree

27. CPOs convey the wrong signal by emphasizing speed rather than correct action.

a. Strongly Agree

b. Agree

c. Uncertain

d. Disagree

e. Strongly Disagree

28. Please list any other benefits/problems you see with the CPOs.

Benefits: _____

_____

_____

Problems: _____

_____

_____

Part V: Your Opinion of ISD in General

29. Please circle all the responses which reflect your opinion of the benefits of using ISD at your unit.

a. Student performance has increased.

b. Student learning rates have improved.

c. Student motivation has improved.

d. Total training time is reduced.

e. Costs are reduced

f. ISD provides definite, yet flexible guidelines for developing and conducting instruction.

g. I don't see any benefits in using ISD at my unit.

h. Other: _____

_____

_____

30. Please circle <u>all</u> the responses which reflect your opinion of the problems caused by using ISD at your unit.

a. It is extremely time-consuming to develop training using ISD.

b. Developing concise, understandable objectives is a difficult task for many persons.

c. Lack of cooperation or support between agencies hinders the process.

d. Constant turnover of military personnel results in instructors who lack training and experience in performing ISD tasks.

e. Higher headquarters regulations and directives often interfere with the process.

f. The seemingly endless series of changes to the weapon system, regulations, and technical data hinders the ISD process. Much time and money is consumed re-doing tasks.

g. ISD-developed training programs lack sufficient theoretical information to enable long-term retention (in other words, students can absorb material quickly, pass a test, then forget it quickly).

h. I don't see any problems using ISD at my unit.

i. Other: _____

_____

_____

31. Any other comments regarding ISD are appreciated.

Thank you for your time and comments. Please return this survey to:

Captain Guy Fritchman
AFIT/LS
Building 641, Area B
Wright-Patterson AFB OH 45433

Appendix D: Responses to Survey Questions

1. How much experience have you had developing or conducting instruction at the missile unit?

a. less than 6 months
b. at least 6 months but less than 1 year
c. at least 1 year but less than 1 1/2 years
d. at least 1 1/2 years but less than 2 years
e. 2 years or more

Unit	Respondent	Answer
44 SMW	ISMD	e
Ellsworth	DOTI	e
	DO22	e
	DO9	d
90 SMW	ISMD	e
F.E. Warren	DOTI	e
	DO22	e
	DO9	b
91 SMW	ISMD	e
Minot	DOTI	b
	DO22	e
	DO9	c
308 SMW	ISMD	d
Little Rock	DOTI	e
	DO22	d
321 SMW	ISMD	c
Grand Forks	DOTI	e
	DO22	e
	DO9	c
341 SMW	ISMD	e
Malmstrom	DOTI	e
	DO22	e
	DO9	a
351 SMW	ISMD	e
Whiteman	DOTI	e
	DO22	e
	DO9	e

Unit	Respondent	Answer
381 SMW	ISMD	e
McConnell	DOTI	c
	DO22	e

2. What instructor training have you accomplished?

a. Locally developed unit training
b. SAC Missile Instructor course
c. Criterion Referenced Instruction Training (CRIT) course
d. Mini-CRIT course
e. Wing Instructional Systems Manager Training course
f. Academic Instructor School
g. Other:_____

Unit	Respondent	Answer	Comments
44 SMW Ellsworth	ISMD	a,b,d,e	plus Masters and nearly PhD in Education
	DOTI	a,b,d	
	DO22	a	
	DO9	a,b,c	
90 SMW F.E. Warren	ISMD	a,e	
	DOTI	a,d	
	DO22	a,b,c	ECI Course: Principles and Techniques of Instruction
	DO9	a,f	
91 SMW Minot	ISMD	a,b,e	
	DOTI	a,b,g	ECI Course: Principles and Techniques of Instruction
	DO22	a,b,c	
	DO9	b,c	
308 SMW Little Rock	ISMD	a,b,e	ATC ISD course at Carswell
	DOTI	a,b,c,e,f	
	DO22	a,f	
321 SMW Grand Forks	ISMD	b,c,e	
	DOTI	a,b,d	
	DO22	a,b,d,f,g	OJT Supervisor Training; OJT Program Development Training
	DO9	a	

Unit	Respondent	Answer	Comments
341 SMW Malmstrom	ISMD	a,b,g	ECI Course: Principles and Techniques of Instruction; various ATC courses
	DOTI	a,b,f,g	College courses
	DO22	a,b,g	Technical Instruction School at Sheppard
	DO9	a,g	ECI Course: Principles and Techniques of Instruction
351 SMW Whiteman	ISMD	a,b,c,e	
	DOTI	a,b	
	DO22	a,g	ISD course at Sheppard
	DO9	a	
381 SMW McConnell	ISMD	a,b,e	
	DOTI	a,b,c	ECI Course: Principles and Techniques of Instruction
	DO22	a,b,f,g	Others: 7 ATC courses in ISD, Tests & Measurement, Developing Criterion Objectives, etc.

3. Does your unit accomplish task analysis similar to Step 1 in order to produce a list of the knowledge, skills, behaviors, duties, and tasks required of missile combat crew members?

a. Often
b. Sometimes
c. Never
d. Don't Know

Unit	Respondent	Answer	Comments
44SMW	ISMD	b	Seldom
Ellsworth	DOTI	b	
	DO22	b	
	DO9	c	
90 SMW	ISMD	b	
F.E. Warren	DOTI	a	
	DO22	c	
	DO9	a	
91 SMW	ISMD	b	Seldom
Minot	DOTI	a	
	DO22	b	
	DO9	c	
308 SMW	ISMD	b	
Little Rock	DOTI	c	
	DO22	a	
321 SMW	ISMD	b	
Grand Forks	DOTI	c	
	DO22	b	
	DO9	b	
341 SMW	ISMD	b	
Malmstrom	DOTI	b	
	DO22	c	
	DO9	b	
351 SMW	ISMD	b	Seldom
Whiteman	DOTI	b	
	DO22	b	
	DO9	a	
381 SMW	ISMD	a	
McConnell	DOTI	c	
	DO22	a	

4. Are you aware of any product within your unit or SAC which can be regarded as the result of Step 1? If so please specify?

Unit	Respondent	Comments
44 SMW Ellsworth	ISMD	Task analysis performed when new 616A introduced; also performed when MCC maintenance on LCCs introduced
	DOTI	CPOs
	DO22	CPOs and a unit Weapon System Programmed Text
	DO9	JPRs
90 SMW F.E. Warren	ISMD	CPOs
	DOTI	LCC maintenance had a task analysis performed; CPOs
	DO22	CPOs
	DO9	CPOs; JPRs; SAC developing a task analysis
91 SMW Minot	ISMD	Task analysis done on LCC maintenance training at unit
	DOTI	CPOs and JPRs
	DO22	CPOs
	DO9	JPRs
308 SMW Little Rock	ISMD	CPOs and JPRs; at unit, have done analysis on transition training program
	DOTI	CPOs and JPRs
	DO22	-
321 SMW Grand Forks	ISMD	Task analysis performed on LCC maintenance procedures; CPOs
	DOTI	CPOs
	DO22	CPOs and nothing else. With respect to EWO, policy and procedures set at HQ SAC and JCS levels with no unit input
	DO9	JPRs
341 SMW Malmstrom	ISMD	CPOs and JPRs; EWO and codes do task analyses; new crew maintenance procedures
	DOTI	CPOs
	DO22	CPOs
	DO9	JPRs

Unit	Respondent	Comments
351 SMW Whiteman	ISMD	This is mostly a human resources step done by other agencies (i.e. SAC); only done at unit for new requirements (CPOs)
	DOTI	CPOs and JPRs
	DO22	CPOs; task analysis for new procedures in TOs
	DO9	JPRs
381 SMW McConnell	ISMD	Transition training to MCCC based on task analysis
	DOTI	CPOs
	DO22	Coverage rates of specific subjects listed in SACR 50-21 are based on frequency of task performance and complexity of task

5. Does your unit accomplish the tasks listed in Step 2 in order to produce a set of instructional standards?

a. Often
b. Sometimes
c. Never
d. Don't Know

Unit	Respondent	Answer	Comment
44 SMW	ISMD	b	Seldom
Ellsworth	DOTI	a	
	DO22	c	
	DO9	c	
90 SMW	ISMD	b	
F.E. Warren	DOTI	a	
	DO22	c	
	DO9	b	
91 SMW	ISMD	b	Seldom
Minot	DOTI	a	
	DO22	b	
	DO9	c	
308 SMW	ISMD	b	
Little Rock	DOTI	c	
	DO22	a	
321 SMW	ISMD	b	
Grand Forks	DOTI	b	
	DO22	a	
	DO9	c	
341 SMW	ISMD	b	
Malmstrom	DOTI	a	
	DO22	a	
	DO9	b	
351 SMW	ISMD	b	
Whiteman	DOTI	b	
	DO22	a	
	DO9	a	
381 SMW	ISMD	b	
McConnell	DOTI	a	
	DO22	a	

6. Are you aware of any product within your unit or SAC which can be regarded the result of Step 2? If so, please specify.

Unit	Respondent	Comments
44 SMW Ellsworth	ISMD	Performed when new 616A introduced; also performed when MCC maintenance on LCC introduced
	DOTI	50-16 Vol I tasks us to train each task on annual basis - we determine at this step how to maintain proficiency and document in local plans
	DO22	CPOs and a unit Weapon System Programmed Text
	DO9	JPRs
90 SMW F.E. Warren	ISMD	CPOs are result
	DOTI	LCC maintenance had tasks in Step 2 accomplished prior to introduction of training
	DO22	CPOs
	DO9	SAC has set up standards in regulations and CPOs
91 SMW Minot	ISMD	LCC maintenance training
	DOTI	--
	DO22	CPOs
	DO9	Provided to us in SACR 55-56, Vol I in the form of JPRs
308 SMW Little Rock	ISMD	CPOs and JPRs; at unit have had Step 2 performed on transition training program
	DOTI	CPOs and JPRs
	DO22	--
321 SMW Grand Forks	ISMD	CPOs; at unit, Step 2 tasks performed on LCC maintenance
	DOTI	CPOs, Plan of Instruction, Local training regulations
	DO22	CPOs; SACR 50-21 and SACR 50-16, Vol I
	DO9	JPRs

Unit	Respondent	Comments
341 SMW Malmstrom	ISMD	Produce instruction standards above CPOs
	DOTI	We make CPOs into specific standards in local plans
	DO22	CPOs
	DO9	Incorporation of JPRs
351 SMW Whiteman	ISMD	SAC created JPRLs and CPOs; at unit: look at availability of classroom facilities, shelf life considerations, manpower resources and document on local plans
	DOTI	CPOs and JPRs
	DO22	New TO and tasks
	DO9	Master Lesson Plan
381 SMW McConnell	ISMD	Step 2 tasks performed on MCCC transition training
	DOTI	CPOs, DOTI OIs, special and supplemental lesson plans
	DO22	CPOs

7. Does your unit use written objectives as the basis for training?

a. Often
b. Sometimes
c. Never
d. Don't Know

Unit	Respondent	Answer	Comments
44 SMW	ISMD	a	Always
Ellsworth	DOTI	a	
	DO22	a	
	DO9	a	
90 SMW	ISMD	a	
F.E. Warren	DOTI	a	Always
	DO22	a	
	DO9	a	
91 SMW	ISMD	a	
Minot	DOTI	a	
	DO22	a	
	DO9	a	
308 SMW	ISMD	a	Always
Little Rock	DOTI	a	
	DO22	a	
321 SMW	ISMD	a	
Grand Forks	DOTI	a	
	DO22	a	
	DO9	a	
341 SMW	ISMD	a	
Malmstrom	DOTI	a	
	DO22	a	
	DO9	a	
351 SMW	ISMD	a	
Whiteman	DOTI	a	
	DO22	a	
	DO9	a	
381 SMW	ISMD	a	Always
McConnell	DOTI	a	
	DO22	a	

8. Written tests at your unit are based upon specific objectives.

a. Often
b. Sometimes
c. Never
d. Don't Know

Unit	Respondent	Answer	Comments
44 SMW	ISMD	a	Always
Ellsworth	DOTI	a	
	DO22	b	
	DO9	b	
90 SMW	ISMD	a	
F.E. Warren	DOTI	a	
	DO22	a	
	DO9	a	
91 SMW	ISMD	a	
Minot	DOTI	a	Always
	DO22	a	
	DO9	a	
308 SMW	ISMD	a	Always
Little Rock	DOTI	a	
	DO22	a	
321 SMW	ISMD	a	
Grand Forks	DOTI	a	
	DO22	a	
	DO9	a	
341 SMW	ISMD	a	
Malmstrom	DOTI	b	Not as often as should be
	DO22	a	
	DO9	a	

10. Please cite examples of criterion tests used by your unit which require actual demonstration of the student's performance.

Unit	Respondent	Comments
44 SMW Ellsworth	ISMD	MPT scripts; CPOs, however, limit much creativity - though DOTI can go beyond CPOs
	DOTI	Remedial training lesson plans; students demonstrate performance in MPT
	DO22	MPT scripts. Also 1 test per quarter must comply with CPOs. 2 other tests per quarter conform with what my division feels is required beyond CPOs for sufficient knowledge
	DO9	MPT scripts
90 SMW F.E. Warren	ISMD	MPT scripts; mock-up scripts for individual and remedial training; Many examples of self-paced programs
	DOTI	MPT scripts; LCC maintenance demonstrations
	DO22	MPT scripts; tape-testing
	DO9	MPT scripts
91 SMW Minot	ISMD	MPT scripts; learning center (mock-up) scripts for remedial training; biopack training
	DOTI	MPT scripts
	DO22	MPT scripts; learning center scripts
	DO9	MPT scripts
308 SMW Little Rock	ISMD	Learning center scripts for individuals; biopack training; weather corridor plotting
	DOTI	MPT scripts; platforms and escape hatch lesson plans teach, then have student demonstrate; all other training is knowledge training
	DO22	MPT scripts

Unit	Respondent	Comments
321 SMW Grand Forks	ISMD	MPT scripts; learning center tests; test on demonstrating proper donning of Biopack 45
	DOTI	MPT scripts; individual remedial training covering topic areas (i.e. security, power, etc)
	DO22	MPT scripts, standboard evaluations; quarterly CPO test
	DO9	MPT scripts
341 SMW Malmstrom	ISMD	MPT evaluation scripts
	DOTI	MPT scripts; lesson plans which require students to demonstrate (improvement program lesson plans)
	DO22	MPT scripts; simulators other than MPT; tape testing
	DO9	MPT scripts; tests on maintenance at the LCC
351 SMW Whiteman	ISMD	Unit orientation training - students stand by equipment and explain what they would do
	DOTI	MPT scripts
	DO22	MPT scripts; on-site training - perform tasks on actual equipment
	DO9	MPT scripts; computer-assisted instruction
381 SMW McConnell	ISMD	MCCC transition training; MPT scripts; learning center scripts; training on guidance systems
	DOTI	MPT scripts; training alerts where students demonstrate proficiency on actual equipment; evaluations (DOV)
	DO22	MPT scripts; quarterly EWO exam tape tests

11. Does your unit make an effort to sequence objectives and instruction in a manner which is felt to best promote student learning?

a. Often
b. Sometimes
c. Never
d. Don't Know

Unit	Respondent	Answer	Comments
44 SMW Ellsworth	ISMD	a	SACR 50-16 mandates each JPRL be covered at least once a year
	DOTI	a	
	DO22	b	
	DO9	b	
90 SMW F.E. Warren	ISMD	b	Regulations limit sequencing somewhat
	DOTI	a	
	DO22	a	
	DO9	a	
91 SMW Minot	ISMD	b	Limited by regulations (must cover each JPRL annually)
	DOTI	a	
	DO22	b	
	DO9	a	
308 SMW Little Rock	ISMD	a	
	DOTI	a	
	DO22	a	
321 SMW Grand Forks	ISMD	b	
	DOTI	a	
	DO22	b	
	DO9	b	
341 SMW Malmstrom	ISMD	a	
	DOTI	b	Sometimes sequence directed by schedules, etc
	DO22	a	
	DO9	a	

Unit	Respondent	Answer	Comments
351 SMW	ISMD	a	
Whiteman	DOTI	a	
	DO22	a	
	DO9	b	
381 SMW	ISMD	a	
McConnell	DOTI	b	Training often driven by student failures, so we frequently don't have control over sequencing as we'd like to
	DO22	a	

12. At your unit:

a. Student self-pacing methods are used more than lecture
b. Student self-pacing and lecture are used equally
c. Lecture is used more than student self-pacing
d. Don't Know

Unit	Respondent	Answer	Comments
44 SMW Ellsworth	ISMD	b	Self study on complex and lecture in classroom every month; self study prepares students for class, then take a pre-test - if student scores 100% he doesn't take class
	DOTI	b	3-tier system - self-study, lecture MPT
	DO22	c	
	DO9	c	
90 SMW F.E. Warren	ISMD	c	Can't rely on self-pacing to great extent because of criticality of work
	DOTI	c	
	DO22	b	
	DO9	b	
91 SMW Minot	ISMD	b	Remedial training self-paced; classroom training is lecture
	DOTI	b	
	DO22	b	
	DO9	b	
308 SMW Little Rock	ISMD	c	
	DOTI	c	
	DO22	c	
321 SMW Grand Forks	ISMD	c	
	DOTI	c	
	DO22	c	
	DO9	c	

Unit	Respondent	Answer	Comments
341 SMW Malmstrom	ISMD	b	Self-paced complex exercises, lecture groups
	DOTI	b	Formal instruction is lecture; individual instruction is self-paced
	DO22	c	
	DO9	c	Regulations require lecture
351 SMW Whiteman	ISMD	b	Monthly classroom lectures limited to groups of 12 people - seminar and discussion encouraged
	DOTI	b	
	DO22	b	
	DO9	b	
38 1 SMW McConnell	ISMD	b	
	DOTI	c	
	DO22	c	SAC doesn't allow much self-paced EWO training; regulations prescribe classroom sessions for definite time periods

13. Please cite examples of methods in which student participation is encouraged within the training programs of your unit.

Unit	Respondent	Comments
44 SMW Ellsworth	ISMD	Students fill out critiques after each MPT and lecture; monthly videotape in preclass provokes questions; prepare questions prior to monthly lecture
	DOTI	Seminar approach; MPT, mock-ups, remedial one-on-one training
	DO22	Message copying exercises; programmed texts on launch reporting and communications monitoring
90 SMW F.E. Warren	ISMD	Classroom lectures have numerous questions for students
	DOTI	Scenarios presented to students during lecture - asked questions
	DO22	Questions to students during lectures; programmed texts
	DO9	Informal lectures with guided discussion
91 SMW Minot	ISMD	Learning center (mock-ups) on voluntary basis; but there are time and manning limits
	DOTI	MPT scripts
	DO22	Message copying exercise; guided question-answer session during lectures
	DO9	Encourage students to get up in front of class and answer specific questions

Unit	Respondent	Comments
308 SMW Little Rock	ISMD	Participative question session during monthly training (person from audience used)
	DOTI	Transition training from DMCCC to MCCC; participative question session during monthly training; students demonstrate proficiency on platforms and escape hatch; MPT
	DO22	Student inputs used as feedback to clarify misconceptions (critiques)
321 SMW Grand Forks	ISMD	--
	DOTI	Student centered, scenario-based, guided discussions during monthly classroom training
	DO22	Self-improvement programs - both on voluntary and mandatory basis
	DO9	Guided question - answer session during lectures
341 SMW Malmstrom	ISMD	Scenarios with question and answers in classroom; EWO message copying exercises
	DOTI	Improvement program gets people to take additional training; scenarios with question and answer sessions
	DO22	Volunteer program for extra training; direct questions during lectures
	DO9	Discussion and demonstration during lecture
351 SMW Whiteman	ISMD	Complex self-study packages, individual improvement packages, monthly recurring classrooms use seminar and discussion
	DOTI	Seminar format in monthly classroom training
	DO22	Open-ended questions; seminar classrooms in DOT & DO22; many programmed texts for self-study
	DO9	Monthly self-study guide (self-paced)

Unit	Respondent	Comments
381 SMW McConnell	ISMD	MPT scripts; learning center scenarios
	DOTI	Transition training - has cross-talk between students and between them and instructor. Feedback also a big part.
	DO22	FMIS reporting exercises; USKAC 72 message exercises; tape testing

14. Does your unit evaluate the advantages and disadvantages of various media when developing instruction?

a. Often
b. Sometimes
c. Never
d. Don't Know

Unit	Respondent	Answer	Comments
44 SMW Ellsworth	ISMD	a	A monthly meeting of senior persons within training and eval branches discusses new items for training and how to do it
	DOTI	a	
	DO22	b	
	DO9	b	Don't have time always - just go with what we did before
90 SMW F.E. Warren	ISMD	a	
	DOTI	b	Once media set, generally same for future similar instruction
	DO22	b	Sometimes a matter of convenience, as opposed to actually evaluating
	DO9	b	--
91 SMW Minot	ISMD	a	Remedial training examined always to see whether it is better to train in learning center or MPT
	DOTI	b	
	DO22	b	
	DO9	b	As time permits

Unit	Respondent	Answer	Comments
308 SMW	ISMD	b	
Little Rock	DOTI	a	We often try, but resources limit application of this
	DO22	a	
321 SMW	ISMD	b	
Grand Forks	DOTI	b	
	DO22	b	
	DO9	b	
341 SMW	ISMD	b	Must constantly pump out new stuff - deadlines keep you from looking at this carefully
Malmstrom			
	DOTI	b	
	DO22	b	Not much time to worry about this
	DO9	a	
351 SMW	ISMD	b	Seldom. Primarily lecture or discussion with some viewgraphs. Base has limited audio-visual capability
Whiteman			
	DOTI	b	
	DO22	a	Often looked at, but not considered as much as should be - instructors change too much
	DO9	b	
381 SMW	ISMD	a	
McConnell	DOTI	a	
	DO22	b	

15. Does your unit perform a tryout on a small group of students in order to validate instruction?

a. Often
b. Sometimes
c. Never
d. Don't Know

Unit	Respondent	Answer	Comments
44 SMW	ISMD	b	
Ellsworth	DOTI	c	
	DO22	c	
	DO9	c	
90 SMW	ISMD	b	Recently started tryout of DOV script on ordinary crew (crew not held accountable)
F.E. Warren			
	DOTI	b	
	DO22	c	Time doesn't allow
	DO9	b	
91 SMW	ISMD	b	LCC maintenance training had tryout
Minot			
	DOTI	c	
	DO22	c	
	DO9	c	
308 SMW	ISMD	b	
Little Rock	DOTI	c	
	DO22	c	
321 SMW	ISMD	c	Not practical
Grand Forks	DOTI	b	
	DO22	c	
	DO9	c	
341 SMW	ISMD	b	
Malmstrom	DOTI	c	
	DO22	b	
	DO9	c	

Unit	Respondent	Answer	Comments
351 SMW Whiteman	ISMD	b	Very limited tryouts First group of students to take actual instruction help validate, but students are held accountable
	DOTI	c	
	DO22	b	Seldom
	DO9	b	
381 SMW McConnell	ISMD	b	
	DOTI	b	
	DO22	b	

16. Please cite any other method you would consider as a means of validating instruction.

Unit	Respondent	Comments
44 SMW Ellsworth	ISMD	Each training agency has all instructors take each test; coordination process is validation; Chief, ISMD performs each MPT prior to its release
	DOTI	Proof of scripts by other instructors
	DO22	Tryout of tests, instruction and scripts by other instructors and DO5
	DO9	Coordination process; tryout of instruction by other instructors
90 SMW F.E. Warren	ISMD	Analysis of test results
	DOTI	Tryouts by other instructors; coordination process
	DO22	Tryouts by own instructors; coordination process
	DO9	Coordination process
91 SMW Minot	ISMD	Coordination process; DOTI, DO22 give MPT scripts and tests to own crews
	DOTI	Student critique sheets; instructor tryouts of instruction and scripts
	DO22	Coordination process; tryout of instruction by other instructors
	DO9	Questions that are continually high miss questions mandate redoing lesson plan
308 SMW Little Rock	ISMD	Validated by trial and error and by tests after each training session; instructors and evaluators tryout own scripts
	DOTI	A test after each recurring training session; Instructors and evaluators tryout MPT scripts; coordination process validates accuracy, but not effectiveness
	DO22	--

Unit	Respondent	Comments
321 SMW Grand Forks	ISMD	--
	DOTI	Present training to other instructors
	DO22	--
	DO9	Other instructors tryout instruction
341 SMW Malmstrom	ISMD	Coordination process; tryouts by other instructors on scripts and tests
	DOTI	Tryouts by other instructors and evaluators; coordination process; continuous feedback process with students
	DO22	Tryouts by other instructors; coordination process
	DO9	Testing and code handling procedures in field are fed back
351 SMW Whiteman	ISMD	Coordination process also validation somewhat
	DOTI	Coordination process; tryout of instruction by other instructors
	DO22	Scripts tried out by instructors up to 5 or 6 times. Monthly lesson plans presented in instructor training. Coordination is validation
	DO9	Analysis of test results
381 SMW McConnell	ISMD	--
	DOTI	Training validated by actual student performance
	DO22	Classroom, MPT observations; feedback loop

17. How does your unit conduct internal evaluation on its training programs?

Unit	Respondent	Comments
44 SMW Ellsworth	ISMD	DOV checks on crews; STRP meetings every quarter review all deficiencies and where and how to retrain
	DOTI	Quarterly review of lesson plans; tests; DOV evaluations
	DO22	Monthly tests; feedback from self-study exercises; DOV evaluations
	DO9	Tests
90 SMW F.E. Warren	ISMD	Analysis of test results
	DOTI	Look at results of testing and DOV evaluation
	DO22	Continuous review of programs by instructors; review of error analysis; DOV checks; observations of crews
	DO9	Coordination process
91 SMW Minot	ISMD	Triggered by deficiencies from evaluations and tests
	DOTI	DOV checks; periodic review of all training
	DO22	Tests and DOV evaluations
	DO9	Analysis of test results - continuous high miss items mandate redoing of lesson plans
308 SMW Little Rock	ISMD	Evaluations; monthly error analysis; quarterly STRP; analysis of monthly tests
	DOTI	By analyzing monthly tests; through recurring evaluations by DOV
	DO22	Tests and DOV evaluations

Unit	Respondent	Comments
321 SMW Grand Forks	ISMD	Tests; standardization evaluations - student must demonstrate performance
	DOTI	Error analysis on high missed tasks and questions from evaluations and tests
	DO22	Tests and DOV evaluations
	DO9	Tests
341 SMW Malmstrom	ISMD	Coordination; instructor tryouts; also observations of instructors; student feedback
	DOTI	Train concepts a month or two before putting in MPT script; DOV evaluations
	DO22	Periodic review of trends; student feedback; DOV checks
	DO9	Testing and actual performance
351 SMW Whiteman	ISMD	Each student tested after classroom. Long term retention tested on MPT.
	DOTI	Periodic review boards look for trends in faulty performance or training
	DO22	Tests on lesson plans; DOV evaluation; no notice codes and EWO tests
	DO9	Testing
381 SMW McConnell	ISMD	Coordination process
	DOTI	Feedback on student performance (tests, MPT); feedback from other unit agencies (squadrons, DOV, DO5, DO22)
	DO22	Feedback loop (tests, MPT) lets us know how students are doing so we can adjust and reaccomplish when necessary

18. Which of the following would you consider external evaluation? (More than one response may be appropriate)

a. Standardization/Training Conferences
b. CPO conferences
c. EWO conferences
d. Higher Headquarters evaluations
e. Other: _____

Unit	Respondent	Answer	Comments
44 SMW Ellsworth	ISMD	a,b,c,d	
	DOTI	a,b,d,e	Staff assistance visits; cross-talks between units
	DO22	d,e	Staff assistance visits
	DO9	d,e	Codes conference
90 SMW F.E. Warren	ISMD	d,e	Locally developed exercises; unit feedback program
	DOTI	a,b,c,d,e	Own local evaluations i.e. - local stand-board and ORIs
	DO22	a,b,c,d,e	Self-inspection program; staff assistance visits
	DO9	a,d,e	Codes conference
91 SMW Minot	ISMD	d,e	Local exercises
	DOTI	a,b,d	
	DO22	a,b,c,d,e	Staff assistance visits and local exercises
	DO9	d	
308 SMW Little Rock	ISMD	d,e	AF Assistance visit; dignitary visits; staff officer comments; olympic plays
	DOTI	a,b,d,e	Reviewing task analysis from 3901st quarterly pamphlet; inputs to SMES through clarification messages
	DO22	a,b	

Unit	Respondent	Answer	Comments
321 SMW Grand Forks	ISMD	d	
	DOTI	a	
	DO22	a,b,c,d	
	DO9	d,e	Codes conferences; staff assistance visits
341 SMW Malmstrom	ISMD	a,b,c,d,e	DOV an external source - because they aren't a training agency; Standardization-Review Panel
	DOTI	a,b,d,e	DOV in some respects external evaluation
	DO22	b,c,d,e	Required to send much instruction material to HHQ
	DO9	d,e	Codes conferences; no possible code compromises
351 SMW Whiteman	ISMD	d,e	Supervisors (i.e. commanders, operations officers) offer unsolicited comments; 4315th CCTS sends out questionnaires
	DOTI	a,b,c,d,e	Staff assistance visits
	DO22	a,b,c,d	Staff assistance visits; local exercises, supervisors comments
	DO9	a,b,c,d	Codes conferences
381 SMW McConnell	ISMD	d	
	DOTI	a,b,c,d,e	Local exercises; staff assistance visits
	DO22	b,c	

19. Does your unit perform goal analysis when developing training programs?

a. Often
b. Sometimes
c. Never
d. Don't Know

Unit	Respondent	Answers	Comments
44 SMW Ellsworth	ISMD	b	616A modification goals; but CPOs generally preempt this - primary goal to train IAW CPOs - only do for new equipment
	DOTI	b	Goes hand in hand with determining method of training
	DO22	b	--
	DO9	b	Seldom
90 SMW F.E. Warren	ISMD	b	Everyone wants to spark up interest by using something different
	DOTI	b	Officers are implicitly expected to achieve unwritten goals
	DO22	b	Don't specifically say these are our goals
	DO9	d	
91 SMW Minot	ISMD	d	
	DOTI	b	
	DO22	c	
	DO9	b	Seldom
308 SMW Little Rock	ISMD	b	
	DOTI	b	Rarely - no specific examples come to mind
	DO22	b	

Unit	Respondent	Answer	Comments
321 SMW Grand Forks	ISMD	b	
	DOTI	b	
	DO22	c	
	DO9	b	
341 SMW Malmstrom	ISMD	b	Pretty much common sense approach
	DOTI	a	
	DO22	c	
	DO9	a	Want to change attitudes from rote memorization to understanding
351 SMW Whiteman	ISMD	b	No official goal analysis, but each division has own goals
	DOTI	b	Seldom
	DO22	b	
	DO9	d	
381 SMW McConnell	ISMD	b	
	DOTI	b	Seldom
	DO22	b	

20. Does your unit present instruction in the manner recommended by Mager?

a. Often
b. Sometimes
c. Never
d. Don't Know

Unit	Respondent	Answer	Comments
44 SMW Ellsworth	ISMD	b	Crew member enrichment program - student gets pretest and post-test, then course structured on his needs; same structure for Quality Improvement Program
	DOTI	b	
	DO22	b	
	DO9	b	
90 SMW F.E. Warren	ISMD	b	Impractical for tests to cover only objectives; instead take questions from outside objectives - must be ready for anything
	DOTI	b	Mainly used for students having problems
	DO22	a	Student sees objectives right at beginning and gets plenty of practice at each training session
	DO9	a	
91 SMW Minot	ISMD	a	For complex self-study training
	DOTI	c	
	DO22	b	
	DO9	a	This is all in MCCMs' self-study program

Unit	Respondent	Answer	Comments
308 SMW	ISMD	c	
Little Rock	DOTI	b	Transition training to MCCC is an example
	DO22	a	
321 SMW	ISMD	b	
Grand Forks	DOTI	c	
	DO22	c	
	DO9	b	
341 SMW	ISMD	a	Self-study - classroom - MPT process is pretty much same as Mager's recommendation
Malmstrom			
	DOTI	b	
	DO22	b	
	DO9	c	
351 SMW	ISMD	b	
Whiteman	DOTI	b	
	DO22	a	Can't always self-pace, but always other things to tailor to student
	DO9	b	
381 SMW	ISMD	b	
McConnell	DOTI	b	
	DO22	a	Complex training package

21. The CPOs provide a beneficial basis for training and evaluation.

a. Strongly Agree
b. Agree
c. Uncertain
d. Disagree
e. Strongly Disagree

Unit	Respondent	Answer	Comments
44 SMW	ISMD	a	
Ellsworth	DOTI	b	
	DO22	c	
	DO9	b	
90 SMW	ISMD	b	
F.E. Warren	DOTI	b	
	DO22	b	
	DO9	b	
91 SMW	ISMD	a	
Minot	DOTI	b	
	DO22	b	
	DO9	b	
308 SMW	ISMD	a	
Little Rock	DOTI	a	
	DO22	b	
321 SMW	ISMD	b	
Grand Forks	DOTI	b	
	DO22	a	
	DO9	b	
341 SMW	ISMD	a	
Malmstrom	DOTI	b	
	DO22	a	
	DO9	b	
351 SMW	ISMD	b	
Whiteman	DOTI	b	
	DO22	a	
	DO9	b	

Unit	Respondent	Answer	Comments
381 SMW McConnell	ISMD	d	Beneficial for evaluation only; CPOs also not student oriented - they pin down performance only in general terms and are not sufficient for design or operation of training
	DOTI	a	
	DO22	b	

22. Improved communication between DOV and the training divisions is one benefit of the CPOs.

a. Strongly Agree
b. Agree
c. Uncertain
d. Disagree
e. Strongly Disagree

Unit	Respondent	Answer
44 SMW	ISMD	a
Ellsworth	DOTI	b
	DO22	c
	DO9	b
90 SMW	ISMD	b
F.E. Warren	DOTI	b
	DO22	b
	DO9	a
91 SMW	ISMD	b
Minot	DOTI	b
	DO22	b
	DO9	c
308 SMW	ISMD	b
Little Rock	DOTI	b
	DO22	a
321 SMW	ISMD	c
Grand Forks	DOTI	a
	DO22	e
	DO9	b
341 SMW	ISMD	a
Malmstrom	DOTI	a
	DO22	b
	DO9	c
351 SMW	ISMD	c
Whiteman	DOTI	b
	DO22	b
	DO9	c
381 SMW	ISMD	c
McConnell	DOTI	d
	DO22	a

23. CPOs have accurate and appropriate time standards.

a. Strongly Agree
b. Agree
c. Uncertain
d. Disagree
e. Strongly Disagree

Unit	Respondent	Answer	Comments
44 SMW Ellsworth	ISMD	c	There is no guidance as to why certain standards are like they are; there should be reassessment of level 4's not constrained by weapon system
	DOTI	e	
	DO22	d	
	DO9	b	
90 SMW F.E. Warren	ISMD	b	
	DOTI	b	
	DO22	c	
	DO9	b	
91 SMW Minot	ISMD	b	
	DOTI	c	
	DO22		
	DO9	d	
308 SMW Little Rock	ISMD	c	
	DOTI	b	Some too lenient, some too strict however
	DO22	b	
321 SMW Grand Forks	ISMD	c	
	DOTI	c	
	DO22	e	
	DO9	b	
341 SMW Malmstrom	ISMD	d	
	DOTI	c	Many cases good, many cases not
	DO22	b	
	DO9	b	

Unit	Respondent	Answer	Comments
351 SMW Whiteman	ISMD	b	
	DOTI		
	DO22	d	Not all accurate
	DO9	b	
381 SMW McConnell	ISMD	a	
	DOTI	b	
	DO22	c	Some accurate, some not

24. CPOs inhibit trainer/evaluator judgement on the MPT.

a. Strongly Agree
b. Agree
c. Uncertain
d. Disagree
e. Strongly Disagree

Unit	Respondent	Answer	Comments
44 SMW Ellsworth	ISMD	d	Lack of proficiency easy to recognize/it constrains subjectivity, not inhibits
	DOTI	a	
	DO22	b	
	DO9	b	
90 SMW F.E. Warren	ISMD	e	
	DOTI	b	Evaluator now scorekeeper rather than an evaluator
	DO22	d	
	DO9	a	
91 SMW Minot	ISMD	a	
	DOTI	b	
	DO22	b	
	DO9	b	Agree, but that is positive - there should be limited judgement
308 SMW Little Rock	ISMD	d	
	DOTI	a	
	DO22	b	
321 SMW Grand Forks	ISMD	b	But considers this a benefit, not a problem
	DOTI	a	
	DO22	a	
	DO9	d	
341 SMW Malmstrom	ISMD	b	
	DOTI	a	
	DO22	d	
	DO9	c	
351 SMW Whiteman	ISMD	b	
	DOTI	d	
	DO22	b	
	DO9	a	
381 SMW McConnell	ISMD	e	
	DOTI	d	
	DO22	e	

25. CPOs convey the wrong signal by emphasizing speed rather than correct action.

a. Strongly Agree
b. Agree
c. Uncertain
d. Disagree
e. Strongly Disagree

Unit	Respondent	Answer	Comments
44 SMW	ISMD	d	
Ellsworth	DOTI	b	
	DO22	d	
	DO9	d	
90 SMW	ISMD	a	
F.E. Warren	DOTI	d	
	DO22	d	
	DO9	a	
91 SMW	ISMD	a	Often hear crews comment at outset of a problem on the MPT on how long they have, not what they have
Minot			
	DOTI	b	
	DO22	d	
	DO9	d	
308 SMW	ISMD	d	
Little Rock	DOTI	d	
	DO22	d	
321 SMW	ISMD	c	
Grand Forks	DOTI	d	
	DO22	e	
	DO9	d	
341 SMW	ISMD	b	
Malmstrom	DOTI	a	
	DO22	d	
	DO9	b	

Unit	Respondent	Answer	Comments
351 SMW Whiteman	ISMD	b	Crews skip steps because of improper emphasis on speed
	DOTI	d	
	DO22	d	
	DO9	b	
381 SMW McConnell	ISMD	e	
	DOTI	d	
	DO22	d	

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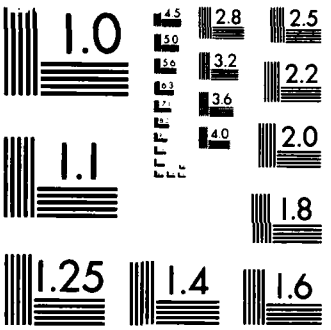

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

26. Are there any other benefits or problems with the CPOs that you would care to discuss?

Unit	Respondent	Comments
44 SMW Ellsworth	ISMD	Problem: CPOs necessary/but structure should be changed for more flexibility and realism
	DOTI	Problem: CPOs should only be a guide for training; but for evaluation they are proper; can be improved
	DO22	Problem: Doesn't list all required actions to be evaluated
	DO9	--
90 SMW F.E. Warren	ISMD	--
	DOTI	Problem: Students dwell more on CPOs than on task itself. They learn only as much as they have to
	DO22	Problem: MCCMs often more concerned with CPO than task itself; CPOs not tested or validated prior to publishing
	DO9	--
91 SMW Minot	ISMD	Problem: No training really goes beyond CPOs any more
	DOTI	Benefits: Provides basic expectations to MCCMs and good outline for lesson plans; Problem: Inhibit total concept understanding; create artificial environment and standards
	DO22	--
	DO9	--
308 SMW Little Rock	ISMD	Benefit: Standardize training and evaluation Problem: Task coding forces some to get error even when not in position
	DOTI	Problem: Existence of CPOs limits training and knowledge - people rarely go beyond what CPOs require
	DO22	Benefit: Standardization

Unit	Respondent	Comments
321 SMW Grand Forks	ISMD	Benefit: Provides black and white guidance Problem: Can inhibit training - it is necessary for SAC to mandate training above standards of CPOs
	DOTI	--
	DO22	Benefit: Sound foundation of performance requirements Problem: Promotes mediocrity - crews know just enough to get by
	DO9	--
341 SMW Malmstrom	ISMD	Problem: Puts too much emphasis on things crew members do seldom; don't update CPOs fast enough when a change needed
	DOTI	Problem: Try to be all inclusive, but they are not - leaves problem of interpretation
	DO22	Problem: Same penalty for not doing a task at all, as for missing CPO timing
	DO9	Problem: People interpret CPOs in different ways
351 SMW Whiteman	ISMD	Problem: Stress performance at expense of knowledge and skills - emphasis on time, but actually should emphasize prompt skillful action; CPOs don't allow imagination of instructors - because of criticality of tasks and time constraints
	DOTI	--
	DO22	Benefit: CPOs a self-study guide for crew member himself
	DO9	--

Unit	Respondent	Comments
381 SMW McConnell	ISMD	Benefit: Standardizes evaluation and training Problem: Still too much room for personal interpretation
	DOTI	Benefit: Objective standards, not based on judgement of evaluator; Leaves little doubt about what's expected of student Problem: Sometimes don't cover enough contingencies; Not updated frequently enough
	DO22	Benefit: Standardize training & evaluation Problem: CPOs not designed to evolve with changes in SAC philosophy - lag behind real world - create more questions than answers

27. Which of the following statements reflect your opiniion of the benefits of using ISD at the operational missile unit.

a. Student performance has increased.
b. Student learning rates have improved.
c. Student motivation has improved.
d. Total training time is reduced.
e. Costs are reduced.
f. ISD provides definite, yet flexible guidelines for developing and conducting instruction.
g. I don't see any benefits in using ISD at my unit.
h. Other _____

Unit	Respondent	Answer	Comments
44 SMW Ellsworth	ISMD	a,b,c,f,h	h: Because it has mandated CPOs, it allows crew member to focus study time
	DOTI	b,f	
	DO22	g	
	DO9	f	
90 SMW F.E. Warren	ISMD	d,f	
	DOTI	a,b,c,d,e,f	
	DO22	c,d,e,f	
	DO9	b,c,d,e,f	
91 SMW Minot	ISMD	a,c,f	
	DOTI	f	
	DO22	a,b,d,f	
	DO9	a,b,c,d,e,f	
308 SMW Little Rock	ISMD	a,b,d,e,f	
	DOTI	g	
	DO22	f	
321 SMW Grand Forks	ISMD	a,b,f,h	h: Makes us look at entire training program to see if it is effective; also increases coordination between DOTI, DO9, DOV, DO22
	DOTI	f	
	DO22	f	
	DO9	a,b,d,f	

Unit	Respondent	Answer	Comments
341 SMW	ISMD	b,c,f	
Malmstrom	DOTI	a,b,e,f	
	DO22	e,f	
	DO9	g	
351 SMW	ISMD	f	
Whiteman	DOTI	f	
	DO22	b,d,e,f,h	h: A common focus for training and evaluation
	DO9	b,f	
381 SMW	ISMD	a,b,d,f	
McConnell	DOTI	a,d,f,h	h: Enhances instructor expertise; involves the student more
	DO22	d,h	h: Closes the loop on training to provide feedback to improve areas which show weakness. We train what is needed based on statistical evidence

28. Which of the following reflect your opinion of the problems caused by using ISD at the operational missile unit?

a. It is extremely time-consuming to develop training using ISD.
b. Developing concise, understandable objectives is a difficult task.
c. Lack of cooperation or support between agencies hinders the process.
d. Constant turnover of military personnel results in instructors who lack training and experience in performing ISD tasks.
e. Higher Headquarters regulations and directives often interfere with the process.
f. The seemingly endless series of changes to the weapon system, regulations, and technical data hinders the ISD process. Much time and money is consumed re-doing tasks.
g. ISD-developed training programs lack sufficient theoretical information to enable long-term retention (in other words, students can absorb material quickly, pass a test, then forget it quickly).
h. I don't see any problems using ISD at my unit.
i. Other _____

Unit	Respondent	Answer	Comments
44 SMW Ellsworth	ISMD	d, i	For d: DMCCCs can only stay instructors a short time; as soon as someone becomes useful it is time to leave. For i: Constraints on Steps 1 and 2 hinders flexibility with rest of process
	DOTI	c,d,f,i	For i: People don't care unless it is in CPOs and evaluatable
	DO22	a,b,d,e,g	
	DO9	a,b,c,d,e,f,g	

Unit	Respondent	Answer	Comments
90 SMW	ISMD	b,c,d,e,f,g	
F.E. Warren	DOTI	c,d,f,g	
	DO22	b,d,i	For i: Some people more concerned with how you are doing it as opposed to what you are doing
	DO9	c,d,e,g	
91 SMW	ISMD	a,c,d,e,f	
Minot	DOTI	c,g,i	For i: Students perform only to level of CPO standard
	DO22	a,b,d,e,g	
	DO9	b,d,e,f,i	No real focus on recurring training - it seems like once students learn a task, training is done
308 SMW	ISMD	a,b,c,d,f,g	
Little Rock	DOTI	a,b,c,d,e f,g	For e: One regulation generally says to use ISD, but other regulations restrict it by requiring a particular # of hours for training
	DO22	d	
321 SMW	ISMD	b,d	
Grand Forks	DOTI	a,c,d,e,i	For i: Too many regulations and too much emphasis on numbers of hours of training rather than quality; inhibits effectiveness of ISD
	DO22	c,d,e,g	
	DO9	a,b,c,d,e,g	

Unit	Respondent	Answer	Comments
341 SMW Malmstrom	ISMD	b,d	
	DOTI	b,c,d,e f,g,i	For i: Because we are not a training unit, it is hard to apply
	DO22	b,c,d,e,g	
	DO9	a,b,c,d,f,g	
351 SMW Whiteman	ISMD	b,c,d,f,i	For i: Job centered, student centered training only provided lip service at units For f: When you keep changing what someone learned first time, it hinders students (what is learned first is learned best)
	DOTI	a,b,c,d,f,g	
	DO22	a,b,c,d,f,g	
	DO9	a,b,d,f,g	
381 SMW McConnell	ISMD	a,c,d	
	DOTI	a,c,d,e f,g,i	For i: Results gained may not be worth effort spent
	DO22	c,e,f,g	For c: Often receive CPOs later than when you need them For f: Usually have 1 or 2 days notice for changes - <u>prevents</u> ISD

29. This concludes the structured part of my survey; however, I would appreciate any other comments regarding this survey, ISD in general, or any specific aspects of ISD.

Unit	Respondent	Comments
44 SMW Ellsworth	ISMD	Big concern within SAC about reassessing CRI - must give MCCMs greater depth of knowledge. There is flexibility and autonomy with ISD
	DOTI	--
	DO22	EWO training attempts to use ISD in a modified manner, however, we teach all required subjects not because crew force needs that much training, but because SAC regulations, the importance of minimal errors in EWO, and the never ending requirement to impress inspectors causes each EWO Training Office to train beyond standards and requirements
	DO9	--
90 SMW F.E. Warren	ISMD	Only real benefit of ISD at unit is for courseware developers - it is a roadmap for lesson planning
	DOTI	--
	DO22	--
	DO9	--
91 SMW Minot	ISMD	Not enough strife to train above CPOs
	DOTI	--
	DO22	--
	DO9	--
308 SMW Little Rock	ISMD	ISD forced on units, don't have any real way of comparing with something else
	DOTI	ISD theory is good information, but not real useful or effective to practice at missile unit. Students must be trained as crews, not individuals
	DO22	--

Unit	Respondent	Comments
321 SMW Grand Forks	ISMD	Missiles train minimum, but nowhere does ISD say anything about minimum. (SAC perhaps has misinterpreted intention of ISD.)
	DOTI	--
	DO22	HQ SAC doesn't understand and isn't concerned with ISD process - Inspectors allow no ISD-related innovation
	DO9	--
341 SMW Malmstrom	ISMD	--
	DOTI	ISD good in perfect world of ATC - harder to apply at operational unit
	DO22	--
	DO9	--
351 SMW Whiteman	ISMD	ISD is just a tool, not a panacea; Must make it clear that individual is responsible for own proficiency
	DOTI	--
	DO22	--
	DO9	Missile units don't really have flexibility offered by ISD. Fast students and slow students still must progress at same pace.
381 SMW McConnell	ISMD	Avid believer in ISD. Big problem is evaluator acceptance of it - everyone must commit to it
	DOTI	Good in theory, not totally applicable - doesn't really help instill system knowledge. Self-pacing also hard to do - can't depend on students in a weapon system of critical nature.
	DO22	--

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VITA

Captain Guy J. Fritchman was born on 23 June 1954 and raised in Allentown, Pennsylvania. He attended Lehigh University in Bethlehem, Pennsylvania, where in 1976 he received the degree of Bachelor of Arts in Government. Upon graduation, he was commissioned in the USAF through the ROTC program. As an Air Force officer, Captain Fritchman served seven years in the 381st Strategic Missile Wing (SMW) located at McConnell AFB, Wichita, Kansas. While at McConnell AFB, he held positions in the Operations Deputate relating to the Titan II missile: Missile Combat Crew Commander; Weapon System Instructor; Chief, Emergency War Order Training Branch; and Wing Instructional System Manager. He completed his service to the 381st SMW in May 1984, and entered the School of Systems and Logistics, Air Force Institute of Technology, Wright-Patterson AFB, Ohio.

Permanent Address: 713 N. LaCrosse Street
Allentown, Pennsylvania 18103

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This thesis describes the Instructional System Development (ISD) process as it relates to missile combat crew member (MCCM) training at Strategic Air Command units. Written due to the lack of ISD literature applicable to operational units, it is intended to serve as a practical guide for instructors and staff members at the missile unit, enabling them to understand, apply, and control ISD in the development of MCCM job training with greater confidence and efficiency. Its description is based upon careful synthesis of related literature, telephone interviews, and a comprehensive survey of missile unit instructor cadre.

Specific focus within the thesis is on the ISD models applied at the missile unit, and the problems/benefits of applying ISD to MCCM job training. Research findings indicate that missile unit instructors modify the specific procedures recommended by two ISD models: the Five-Step Model and the Criterion Referenced Instruction Model. The problems/benefits of applying ISD at the missile unit are found to be similar to those at Air Training Command units. Overall indications are that missile unit instructors regard ISD models as useful tools for developing and conducting MCCM job training.

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